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The Commonwealth of Massachusetts

ANNUAL REPORT

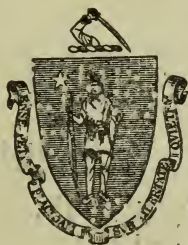
OF THE

Division of Fisheries and Game

FOR THE

YEAR ENDING NOVEMBER 30, 1926

Mass.: DEPARTMENT OF CONSERVATION: Division of
fisheries and game



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STATE HOUSE, BOSTON

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The Commonwealth of Massachusetts

The Director of Fisheries and Game herewith presents the sixty-first annual report.

GENERAL CONSIDERATIONS

In recent reports we have discussed, from one angle or another, the several principles upon which the protection and propagation of wild life are based in the different parts of the world. These run all the way from complete private ownership of game in some of the European countries, through to the public ownership theory that obtains in the United States.

In recent years the idea of game administration has taken a firm hold on our people, as distinguished from the old hit-or-miss policy of earlier years. Game administration, as the term implies, means the adoption of modern business methods in dealing with the propagation of game. The basic consideration is that of adequate financing of the things to be done. It is interesting to trace out what this represents, both under the theory of private ownership and that of public ownership. Under private ownership, operations are financed entirely by the owner of the land. He owns all of the game on his property and farms and administers it like any other crop. His income depends on the inventory of game that he can show to prospective renters of the shooting privilege immediately prior to the shooting season. It is to his personal interest to show the largest possible inventory, and as a result he does those things on his property which are best calculated to maintain the largest supply. Out of his own pocket he provides patrol against poaching, employs help to exterminate vermin, plants food and does the many necessary things to maintain proper conditions on such parts of his land as are primarily devoted to this purpose. In many instances he carries on a certain amount of artificial propagation. In other words, he invests some of his working capital in this enterprise, just as he buys fertilizer for his crops. His return on his investment comes through the leasing of the shooting and fishing privileges on his property. It is a business proposition from start to finish, and the sentimental side of it is enlarged upon and enjoyed by the man who buys up these privileges and enjoys the recreational sport of pursuit. All of this makes for an intensive development of the country, with a corresponding large production of at least certain species of game.

The picture in the United States, where we operate under the public ownership theory, is entirely different. Title to all the game lies in the people. Some years ago it was finally realized that the migratory species of game belongs to all the people of all the states; that it was in one state today and in another state a week later; that there were insuperable obstacles to any state trying to assume complete control of this game, because of its shifting status. Therefore its control was vested in the Federal government. The states, on the other hand, have complete

jurisdiction over the resident species of game found within their borders. The Federal and state governments, in their respective spheres, say when, where and how this game may be taken, and determine what property rights may be exercised over it when reduced to possession. The land owner has no more proprietary interest in it than has the floating population of our large cities and towns. As a result, he is no more interested in maintaining the supply than are other classes of our citizens. This is perfectly reasonable and should not be construed in any way as an indictment of the land-owning class. If the Federal government and the state governments insist on preserving this public ownership in the wild life, then they must of necessity assume the responsibilities of properly administering it. The agencies through which the wild life is administered by the Federal government and the several states are well known. Most of these agencies are operating along more or less similar lines, though local conditions may result in some variation in policy.

For the moment we are discussing those species of wild life which provide recreation as well as food for our people, as distinguished from certain other groups, such as the commercial fishes and the fur-bearing animals, which are largely economic. The work of the administrative agencies is financed in various ways in the several governments, ranging from appropriations made out of funds raised by general taxation, to the use of only those funds which are contributed by the fresh-water anglers and hunters. The sentiment seems to be growing throughout the country, as closer study is given to the cost of government operations, that the work carried on in the interest of the fresh-water fishermen and hunters should be largely, if not entirely, self-supporting, through a moderate charge in the shape of a license fee to cover the exploitation of these natural resources which are the property of all the people.

The proposition is reasonable if not carried too far. It is obvious that there are certain branches of Federal and State governmental activities which, from their very nature, can never be made revenue-producers, and hence will have to be financed entirely out of funds raised by general taxation. Others, such as the work in the interest of the sportsmen, can, through a license system, be made substantially self-supporting. Yet we should not lose sight of the fact that these sportsmen (and they are a representative group of our citizens, the term used in its broadest sense to include anglers as well as hunters) pay their proportionate share of the general taxes in addition to this special contribution in the shape of a license fee to support the work that is of special interest to them. This being the case, it is reasonable to expect that all of the funds paid in for licenses will be expended in administering the species of wild life in which this group is particularly interested, and that some additional sum out of the moneys raised by general taxation will be added to the license fees. The sportsmen the country over are coming to appreciate the reasonableness of the foregoing theory of financing the Federal and State administration of game and fish. They more fully understand today that the purchase of this license, which will entitle them to the enjoyment of a whole year's sport, subject to law, costs them less than would the privilege of enjoying one day's sport under the European system of the private ownership of game. For example, in our State this year the sportsman pays \$2.25 for a sporting license, which opens up to him the opportunity to pursue all species of game and fish. Under this license he has the potential opportunity to bag one deer, 91 upland game birds, 820 hares, rabbits and squirrels, 9,180 shore birds and water fowl, and upwards of 30,000 fish. The trapper, upon payment of \$2.25, may take unlimited quantities of all fur-bearing animals (except raccoons, of which the limit is 25) throughout a long open season. A single pelt from any of these animals would yield enough to reimburse him for the cost of this fee. Our sportsmen are beginning to realize the extraordinary privileges represented in the low-priced license. They understand more clearly than

ever before, that larger sums will have to be expended, year after year, in order to maintain an adequate supply of game; and that the complications of an enlarging civilization will make it increasingly difficult to preserve a sufficient stock to meet increasing demands.

PERSONNEL

There were no changes in administrative personnel.

FINANCES

	Appropriations	Expenditures	Balances	Corrected Balances (See footnotes)
<i>Maintenance</i>				
Salary of the Director	\$4,000	\$4,000.00	—	—
Services, office assistants	9,660	9,651.10	8.90	8.90
Office Expenses	8,000	7,430.45	569.55 ^a	69.55
Education and Publicity	1,000	497.48	502.52 ^b	2.52
Enforcement of Laws:				
Personal Services	60,500	58,838.07	1,661.93 ^c	361.93
Expenses	24,000	23,951.46	48.54	48.54
Coastal Warden Service	6,000	5,991.30	8.70	8.70
Biologists:				
Personal Services	4,700	4,643.18	56.82	56.82
Expenses	2,400	2,382.81	17.19	17.19
Propagation of Game Birds, Animals and Food Fish	86,000	88,239.89 ²	(Overdraft) 2,239.89	60.11
Marine Fisheries:				
Personal Services	7,950 ¹	7,950.00	—	—
Expenses	2,200	2,155.27	44.73	44.73
<i>Special Construction</i>				
Improvements and additions at Fish Hatcheries and Game Farms	5,000	3,298.48	1,701.52	1,701.52 ³
	\$221,410	\$219,029.49	—	\$2,380.51
Less amount available for use in 1927				1,701.52
Actually returned to Treasury				\$678.99

¹ The budget appropriation for Marine Fisheries, personal services, was increased by \$90 (from a special fund of the Commission on Administration and Finance) to cover salary increases.

² Toward the close of the fiscal year it was apparent that the appropriation for the Propagation of Game Birds, Animals and Food Fish of \$86,000 would be insufficient to cover all of the necessary expenditures to carry on the work included in this item of the budget. Out of this sub-division of the appropriations we must operate all the game farms and fish hatcheries, conduct the salvage of white perch and other fish, purchase outside stock, such as white hares, and pheasants for changing the blood lines in the brood stock, and many other items. In order to avoid curtailment of the year's work the situation was laid before His Excellency the Governor and the Council, and on September 15 an order was issued crediting the foregoing appropriation with \$2,300, being a transfer from the appropriation for Extraordinary Expenses, upon a guarantee from the Division that an equal amount would be returned unexpended from other divisions of our appropriations. This was done.

(Footnotes continued on next page.)

The revenue turned into the State Treasury was: for license fees (see details below), \$226,520.95; rent at Palmer Hatchery, \$144.00; sale of game tags, \$74.95; sale of launch hull, \$85.00; sale of gravel, \$10.50; lease of Chilmark Pond, \$75.00; lease of clam flats, \$65.00; permits to take shiners and suckers, \$180.00; sale of fancy pheasants, \$45.00; conscience fund, \$1.00; overpayment by city and town clerks, \$2.85; fines turned into the State Treasury from the county treasuries as a result of fish and game law violations, \$9,890.20; total, \$237,094.45.

Receipts in detail of Licenses

(This table includes receipts, not only for the new forms of sporting licenses which went into effect Jan. 1, 1926, but also receipts for old forms of separate hunting, fishing and combination licenses which were in use during December, 1925. December, 1925 is the first month of the fiscal year 1926, which this report covers.)

Form of License	Total Number Issued	Gross Value	Fees to Clerks	Net Return to State
Received for forms of licenses issued prior to calendar year 1926	23,000	\$33,722.00	\$5,684.35	\$28,037.65
Resident Sporting	91,276	205,371.00	22,819.00	182,552.00
Resident Trapping	1,292	2,907.00	323.00	2,584.00
Non-resident Sporting	637	6,664.25	159.25	6,505.00
Non-resident Trapping	12	113.00	3.00	110.00
Alien Sporting	323	4,925.75	80.75	4,845.00
Alien Trapping	—	—	—	—
Minor Trapping	1,369	1,026.75	342.25	684.50
Duplicate Licenses	895	447.50	—	447.50
Lobster Licenses	898	898.00	134.70	763.30
	119,702	\$256,075.25	\$29,546.30	\$226,528.95
Deduct on account of previous overpayments		8.75	.75	8.00
Final net on all licenses	119,702	\$256,066.50	\$29,545.55	\$226,520.95

Inasmuch as the annual reports of past years have made no mention of the amounts turned into the Treasury in fines for violation of the

The following notes indicate how it was worked out:—

^a\$500 was returned unexpended from Office Expenses;

^b\$500 was returned unexpended from Education and Publicity;

^c\$1300 was returned unexpended from Law Enforcement, Personal Services. This latter item was taken from Law Enforcement only when it was ascertained that salary increases for the wardens would not be granted sufficient to use up this amount, although the money had been appropriated.

* The appropriation for Improvements and Additions at Fish Hatcheries and Game Farms also covers the purchase of land. For some years we have carried a lease, with option of purchase, on one tract of land. The option expired on March 1, 1927. We did not believe that the lease and option could be renewed at the same price, owing to an increase in land values subsequent to the date of the lease. In order to make certain that the State did not lose the advantages under this lease, \$1,700 of the \$5,000 appropriation was held in reserve to cover the purchase price of this land. These appropriations for special purposes are available for two years.

fish and game laws, the following statement, covering the last twenty years, is of interest:

1905	\$1,897.60	1916	\$4,892.00
1906	1,678.83	1917	5,205.00
1907	2,555.65	1918	3,984.67
1908	3,970.81	1919	3,214.50
1909	4,397.77	1920	3,299.50
1910	3,711.13	1921	4,157.25
1911	2,584.06	1922	4,524.50
1912	3,935.43	1923	4,441.25
1913	5,460.75	1924	7,060.35
1914	5,412.50	1925	7,470.00
1915	5,010.50	1926	9,890.20

New sources of revenue are the five-dollar fee for the permits to use large nets for taking shiners and suckers for bait for commercial purposes (authorized by Chapter 195, Acts of 1926); the \$2.25 fee for the separate trapping license; and the fifty-cent fee for the replacement of lost sporting or trapping licenses.

This is the first year of operation under the sporting license, which went into effect on January 1, 1926. The fiscal year began on December 1, 1925, so that the moneys received during that month and January, 1926, represented sales of the old separate forms of hunting, fishing or combination licenses. The total cash receipts from sporting licenses of all forms for the fiscal year 1926 (including the trapping licenses) amounted to \$226,520.95. From the foregoing it will be seen that the actual cash paid in by the sportsmen more than paid all of the operating costs of this Division, although a substantial part of its activities were of no more benefit to the sportsmen than to the other classes of our citizens. In addition to the foregoing sum, \$9,890.20 was collected in fines resulting from the activities of the law-enforcement division, and \$683.30 in miscellaneous items. In other words, there was a total cash income of \$237,094.45 against a total appropriation of \$221,320.

The cost of the non-resident sporting license of \$15.25 was considered excessive, and it was reduced to \$5.25. Heretofore the non-resident fisherman could purchase a fishing license for \$2, while a non-resident hunter paid \$10. In view of the fact that the State is spending, each year, a larger sum on the maintenance of the stock of fish than on game; that the non-resident fisherman has a much longer open season in which to pursue his sport; and that all of his minor children under eighteen years may fish without charge,—it is reasonable that the non-resident fisherman should pay as much for this privilege as does the non-resident hunter.

In line with our contention that the proceeds from the sale of sporting licenses should be expended in the interest of those who pay for them, the divisional estimate of operating expenses for 1927 was presented in three parts. The plan and the reasons for it are fully set forth in a letter to the Budget Commissioner, dated November 29, 1926, as follows: Hon. Charles P. Howard,
Commission on Administration and Finance,
State House, Boston, Mass.

Dear Commissioner:

The budget for this Division was submitted to you in three parts, in order to emphasize what we consider to be the proper basis on which to finance the work.

In the division "*Administration, and the Propagation and Protection of Fresh Water Fisheries and Game*" we have grouped all the activities of direct benefit to the sportsmen (used in a collective sense) who buy

licenses. In addition to paying their proportionate share of taxes, these people also make a special contribution in the purchase of a sporting license for the operation of the Division in those matters of special benefit to the sportsmen. This being the case, we feel that annually a sum should be appropriated to carry on this work at least equal to the amount received from such licenses during the previous fiscal year. Such appropriation would maintain our inland warden force (as distinguished from the coastal warden force which has this last year been put on according to the provisions of Chapter 370, Acts of 1926). The law-enforcement service turns in annually a given sum through fines, and this amount should be added to the income from licenses.

During the year 1926 the income from licenses will amount to at least \$225,000. (We now have that much on hand with still several days to go.) We estimate, roughly, the income from fines at \$10,000, or a total cash income to the State of \$235,000.

In making up the budget for 1927 we earnestly urge that a sum equal to \$235,000 be set aside to operate those activities in this Division grouped in our budget under the above title. I could multiply the arguments to great length in favor of the proposition that this cash paid in by a group of our citizens (in addition to their share of the general taxes) should be expended wholly for their benefit.

Furthermore—the cost of doing these things is bound to increase as the years go by. The resources of the Division are taxed more and more each year in providing a reasonable amount of game and fish for this class to exploit in payment of the licenses purchased. There is also a great unfilled need of additional law enforcement, which will require some additional wardens and the complete motorization of the force, together with increased allowances for operating expenses. These demands will have to be met in one of two ways—by the State supplementing the cash received from licenses by additional amounts out of funds raised by general taxation, or by a gradual increase in the cost of sporting licenses.

I believe that it can be worked out for all practical purposes by a gradual increase in the cost of sporting licenses. But this result will have to come gradually. However, it could be materially advanced were the State to set aside a small amount out of the funds raised by general taxation, to be added to the annual sum realized from the sale of licenses in the preceding year. For example, for the year 1927 there should be an appropriation to carry on the work represented by the above title, of \$225,000, plus \$10,000, plus (for the sake of argument say ten per cent of the total cash paid in by the sportsmen) an additional sum out of the funds raised by general taxation of \$25,000, or a total appropriation of \$260,000. This action by the State in appropriating a little more than the sportsmen pay in in cash, will be, in my opinion, a good business proposition. It will show this group that the Commonwealth appreciates its splendid effort to finance the things which the State is doing for them. It should be a very great factor in bringing about an early and slight increase (say twenty-five cents) in the cost of the sporting license, which today is \$2.25.

It is hardly necessary to say that we are studying certain other possibilities for increasing the revenues, in order to take care of these increasing demands, while at the same time, year after year, making this sub-division of our work practically self-supporting.

Division of "*Non-game Bird Reservations and Wild Life Sanctuaries.*" The work of this group has to do with the protection and increase of the species of wild life that cannot be classed as game. These are the song and insectivorous birds, many varieties of our coastal birds, and the saving of one species now on the verge of extinction—the heath hen. While the rank and file of our sportsmen are interested in these forms of wild life, the principal appeal is made to that class of our citizens which is interested in the big outdoors but does not hunt or fish. We estimate

that at least one and a half million of our people are interested in our wild life from this angle. At the present time this class is not contributing one cent toward maintaining the work which the State is carrying on in behalf of the wild life in which they are deeply interested.

The cost of carrying on these activities (which are detailed in the budget) should be provided out of the funds raised by general taxation.

Division of "*Marine Fisheries*." Our work with the marine fisheries and the things that we should begin to do for this, one of our oldest industries, are outlined in the budget. Except to maintain the Division of Fish Inspection within this division, the State has spent very little in any year for the commercial fisheries. However, out of the appropriations for the Division, we have expended substantial amounts on certain salt water species which come into fresh water to breed. All of these items of expense have been, in the past, buried in the general appropriation for the Division.

For many years the Commonwealth, and rightly, has expended substantial sums annually in the furtherance of agriculture. This money has been provided out of the funds raised by general taxation. In view of the fact that the marine fisheries are equally concerned, with agriculture, in producing a valuable food supply at a reasonable cost, we feel that the work of the Division in the interest of the marine fisheries should be financed out of funds raised by general taxation. One of our wholesale houses has summed up the whole situation as follows—

"We call your attention to the fact that the fishermen and the farmers feed the world. The sea and the soil provide our daily food."

There is a real demand for the enlargement of our Division of Fish Inspection. Ample facts are available to show that it has been beneficial to the industry, itself, and of enormous benefit to the fish consuming public by reason of an improvement in the quality of fish now being distributed throughout our State as food. There are other items detailed in the budget which should now begin to receive attention."

Very truly yours,

WILLIAM C. ADAMS, *Director*.

There are certain fields in which the revenues may be increased before consideration is given to raising the present charge for the sporting license. The fines paid this year totalled \$9,890.20 on the basis of 943 convictions for violations of fish and game laws. A comparison of our statutory fines for such violations with fines established in other states for the same violations, shows that in Massachusetts the range is lower than it should be. Were it not for the fact that upon conviction for a violation of our laws the sporting license of the offender is revoked for one year, and he is barred from obtaining a license within one year from date of conviction if not possessing one at the time of conviction, there would be very little deterrent force in the amount of the fines now imposed for most classes of violations. A substantial increase in the schedule of fines would not only be an increasing deterrent factor in preventing violations of law, but would also be a source of additional revenue.

Today no license is required of those fishing for smelt in our coastal streams or bays. In view of the fact that in years past a substantial amount of the time of our wardens has been expended each spring in protecting the spawning beds of the smelt, and substantial sums have been expended in the collection and hatching of eggs and the distribution of spawn, it would be entirely reasonable to require all smelt fishermen to purchase a sporting license.

Study should be made of our present system of issuing the sporting licenses. Under present practices these are printed and are distributed to the city and town clerks through this Division. The clerks issue the licenses, and make a return monthly to this Division of all moneys collected

in the preceding month. Each clerk retains twenty-five cents from the price of each license (except for duplicate licenses) as a charge for issuing the same. During the past fiscal year it cost \$29,545.55 to issue 119,702 licenses. We believe that some way can be devised to do this with equal or greater convenience to the public, with equal security to the Commonwealth, and at a substantial saving in cost. We have under consideration the Oregon system, by which the licenses are issued through volunteer agencies—in the sporting goods stores, drug stores, and other agencies in the smaller centers. The State is protected by a blanket insurance policy, which automatically covers the agents appointed, from time to time. These agents receive no fees; it is purely a volunteer system. Except for a possible increase in the number of agencies, it does not appear that any different method of bookkeeping or system of distribution would be required from the present method of dealing with the city and town clerks.

Furthermore, we believe that by using such volunteer agencies, the principle of salesmanship could be injected into the plan and the purchase stimulated of a greater number of licenses than are issued today. We believe that hundreds, and possibly thousands, of our citizens who are interested in the out-doors, but who do not hunt or fish, would be willing to purchase licenses to help maintain this State division, which is the only agency that functions for the protection of all wild life, including the song and insectivorous birds and the birds of our coastal region. But in order to reach these people a more elastic system of handling the licenses is needed than exists today. In most cases the clerks receive no personal benefit from issuing these licenses, for in most cases, they receive a straight salary, and therefore the twenty-five cent fee goes into the municipal treasury. There is no incentive to increase the sale of licenses, as would be the case with agents who are primarily interested, either from a commercial or a sentimental point of view, in the activities of the Division.

CONFERENCES WITHIN THE STATE

The regular annual conference of sportsmen and those interested in wild life was held on January 13, at which the proposed new legislation was exhaustively discussed. These meetings are valuable as a clearing house for ideas and the abolishment of misapprehensions and misunderstandings.

On September 24, officers of this Division, upon invitation of the lobstermen of Marblehead, Beverly, Salem and Swampscott, with J. T. Adams of Marblehead acting as host, met in conference with representatives of the industry for the purpose of bringing about better cooperation between the latter and our law-enforcement officers. Various angles of the lobster problem were discussed, including the purchase of egg-bearing lobsters and the method of handling, the necessity of new laws or the revision of old ones, particularly size limits and methods of measuring, i. e., by ring entrance to the pot or by length. It was the sense of the meeting that conditions are better now than they have been for some years; they favored the present measure, but felt that the money provided by the licenses should be spent for more law-enforcement.

ACTIVITIES OUTSIDE THE STATE

The Director attended meetings having to do with activities directed to the consideration of fish and game matters, as follows:

Annual meeting of the American Breeders' Association of the American Game Protective and Propagation Association, Dec. 7-8, 1925, in New York City,—the one annual conference in the country that brings together the heads of the State departments and others interested in the artificial propagation of game, and at which, more than at any other gathering, such subjects are most discussed.

Annual meeting December 10, 1925, in Washington, D. C. of the Advisory Board to the U. S. Bureau of Biological Survey on the Migratory Bird Law, of which the Director is a member.

Second National Outdoor Recreation Conference Jan. 20-21, 1926, in Washington, D. C. The Director is a member of the General Council, and has served on committees of the organization from the time it was called into existence by the President of the United States in 1924.

In the interest of the Game Refuge Bill several trips were made to Washington, and one to Minneapolis (without charge to the State) for consultation with other members of the committee having the bill in charge.

For the first time in many years the Director failed in attendance at the annual gatherings of the fish and game officials of the country and of the American Fisheries Society (at Boise and Mobile), but several new projects recently set in motion required close attention at the time the meetings were in session.

ACKNOWLEDGMENTS

The law (Chapter 301, Acts of 1923) which permits the Commissioner of Conservation to receive gifts of land or personal property for the purpose of aiding in the propagation and protection of useful wild birds, quadrupeds or fish has been in effect several years, and as gifts have been received, mention has been made of them in the annual reports. In order to show a complete picture of what has taken place under that law from the time of its passage, a complete statement of such gifts is presented herewith:

Giver	Description of Gift	Use to be made of it
Ray Nye	Nye homestead and about 37 acres of land in Sandwich.	Permanent wild life sanctuary.
Dr. John C. Phillips	200* acres of land in Boxford; additional 3 acres.	"
Federation of the Bird Clubs of New England	Carr Island (to be known as the Isaac Sprague Bird Sanctuary) in Merimack River off Newburyport, 110 acres. The several buildings on the island were taken down, and yielded a supply of valuable lumber, used in construction work at the fish hatcheries and game farms.	"
"	Ram Island, off Mattapoisett, 2 acres.	"
"	100 acres of land and virgin spruce on Mount Watatic in Ashburnham and Ashby.	"
"	Milk Island (to be known as the Knight Bird Refuge), 15 acres.	"
Four individual contributions of \$2 each	Cash—\$8.	Acquisition of permanent wild life sanctuaries.
Hon. Frank G. Allen	Cash—\$100.	Purchase of land in Sandwich (now held under lease) to be wild life sanctuary on which some propagation work may be carried on.
Dr. R. T. Fisher	Cash—\$10.	Construction of rearing pools at Montague Rearing Station.
The various Fish and Game Associations of the State. (Detailed statement follows).	Cash—\$4,608.21.	For increasing the rearing facilities at the fish hatcheries and game farms, so that trout may be reared to a size large enough to be caught when planted; and to carry pheasants to maturity before liberation.

* Received under Section 69, Chapter 131, General Laws.

<i>Detail of the Contributions from the Fish and Game Associations</i>	
Agawam Sportsman's Club	\$100.00
Andover Fish and Game Club	50.00
Angle Tree Stone Rod and Gun Association—North Attleboro	100.00
Auburn Rod and Gun Club	25.00
Boston Fishing Club (For breeding brown trout at the Amherst Rearing Station)	200.00
Brampton Gun Club—Hopkinton	25.00
Canton Game Protective Association	65.00
Cape Ann Fish and Game Protective Association—Gloucester	121.00
Catamount Sportsman's Club—of Colrain	50.00
Charlemont Sportsmen's Association	16.50
Chester Rod and Gun Club	100.00
Clinton Fish and Game Protective Association	10.00
Dalton Rod and Gun Club	107.00
Dedham Hunting and Fishing Association	100.00
Fin, Fur and Feather Club—Wellesley	25.00
Fish and Game Club of New Bedford	50.00
Florence Fish and Game Association	25.00
Framingham Fish and Game Club	100.00
Franklin County League of Sportsmen's Clubs* (For construction at Montague Rearing Station)	455.71*
Granite City Rod and Gun Club—Quincy	50.00
Greenfield Rod and Gun Club	100.00
Hampshire County Sportsmen's Club	15.00
Haverhill Sportsmen's Club	100.00
Holyoke Fish and Game Association	50.00
Ipswich Fish and Game Protective Association	25.00
Lawrence Fish and Game Protective Association	100.00
Lee Sportsmen's Association	12.00
Leeds Rod and Gun Club	15.00
Legion Rod and Gun Club—Hardwick	50.00
Ludlow Fish and Game Association	75.00
Lynn Fish and Game Protective Association	50.00
Mansfield Fish and Game Protective Association	25.00
Martha's Vineyard Rod and Gun Club	20.00
Maynard Rod and Gun Club	100.00
Merrimack Valley Hunt Club—Lawrence	31.00
Middleboro Fish and Game Protective Association	50.00
New Bedford Rod and Gun Club	200.00
Nipmuc Rod and Gun Club—Mendon	100.00
North Adams Rod and Gun Club	50.00
North Adams Sportsmen's Club	30.00
Northampton Fish and Game Club	100.00
North End Rod and Gun Club of Taunton	25.00
North Shore Rod and Gun Club—Beverly	50.00
Northern Worcester Co. Fish and Game Club—Gardner	100.00
Norwottuck Fish and Game Association—Amherst	100.00
Paper City Rod and Gun Club—Holyoke (Construction at Amherst Rearing Station)	200.00
Paugus Rod and Gun Club—East Pepperell	50.00
Peabody Fish and Game Protective Association	100.00
Sandwich Rod and Gun Club	50.00
Silver Fox Rod and Gun Club—Enfield	50.00
South Seekonk Gun Club	35.00
Southern Worcester Co. Fish and Game Association	25.00
Springfield Fish and Game Association (For Palmer Hatchery or Wilbraham Game Farm)	300.00

* This League also paid bills for labor amounting to \$144.29, making the total contribution \$600.

14	P.D. 25
Sugar Loaf Sportsman's Club—South Deerfield	100.00
Tanampo Club—Marstons Mills	80.00
Walpole Sportsman's Association	100.00
Westfield Rod and Gun Club, Inc.	150.00
Whitman Rod and Gun Club (Care and housing of pheasants)	10.00
Williamsburg Rod and Gun Club	10.00
	<hr/>
	\$4,608.21

The following statement shows the amounts expended at each station in 1925 and 1926 from the club contributions, and the items of work accomplished.

Amherst Rearing Station—\$1,006.59.

Construction of 5 new cement dams to replace worn-out, temporary wooden dams, and the enlargement of existing pools for yearling fish.

A new cement dam across the foot of a series of existing pools, which permitted the enlargement of these pools and addition of others, resulting in one pool 60 x 12 x 3 ft.; two ponds 30 ft.; two ponds 45 ft.; six ponds 30 ft.

In addition, one pond was partly finished 200 x 12 x 3 ft.

Another section was partly dug out for two ponds which will be 100 ft. long each.

Montague Rearing Station—\$1,250.90.

Reconstruction of three concrete dams to replace temporary wooden dams, together with the reconstruction of a series of 3 large pools above the main dam, with an enlargement and deepening of the same, all for the purpose of carrying yearling trout; also in extending a tile line from a group of springs to feed these ponds.

Construction of concrete dam at the outlet of large pond below ice house on the back stream, accompanied by digging all of the pond a foot deeper for carrying yearling trout and brood stock.

Repairing the big dam and replacing much of the wood work. Most of the remaining stumps were removed.

In addition, deepening the pond above the dam to grow yearlings.

A section of the valley was cleared of underbrush and timber, in connection with a survey for larger ponds.

Construction of 4 ponds 100 x 12 x 3 feet, together with a roadway 18 ft. wide running parallel with these ponds.

Pipe lines were installed in order to carry water from the rest of the system to supply these pools.

Palmer Fish Hatchery—\$235.50.

A new pool, 165 x 8 ft. was built for carrying over fingerling trout to the yearling size. Temporary screens were put in the inlet and outlet in order to make use of the pool during the late summer and fall rearing season.

Sandwich Fish Hatchery—\$484.03.

Three large dirt pools (15 x 200 ft.) divided into six ponds by dam placed across the center of each, were constructed.

A part of the area between present hatchery grounds and the State road was cleared off in order to permit close inspection of the possibilities of this area for construction of additional ponds.

Sutton Fish Hatchery—\$322.45.

The old pheasant pens were repaired by re-setting concrete slabs that form the base and replacing rusted-out wire. Some of the pens were also resurfaced with a heavy filling of sand.

Some of the pools above the main pond were repaired, some enlarged, and the water deepened for the carrying of yearling trout.

Below the road the line of unused ponds extending to the lower part of the brook were cleaned out, sections of concrete slab re-set, three division dams of concrete put in, and some miscellaneous concreting done to refit these ponds for carrying yearlings.

East Sandwich Bird Farm—\$388.07.

Two large brailing yards were constructed for carrying over young birds to be liberated as adults in the spring.

Additional quarters were provided by converting six chicken houses into brooder houses, with new covered yards in front, making a continuous divided yard 120 x 30 ft.

Marshfield Game Farm—\$184.81.

Additional fencing was put up to connect the large brailing yard around the orchard with the yards adjoining the brooder houses on the hill, in order to make an additional enclosed field for the carrying of brailed birds.

The brailing yard in the orchard was sub-divided by additional fences.

Work was started on the construction of a large yard to take in all of the swamp and upland in front of the two brooder houses and the orchard.

Wilbraham Game Farm—\$469.87.

The framework was put up for a brailing yard 735 x 735 ft. and part of the wire purchased.

A wire-covered pen, 36 x 36 ft. was built to trap birds to be shipped. The frame work was painted.

Miscellaneous—\$145.01.

This amount was put out in freight and carting bills in the distribution, to the various stations, of the lumber salvaged on Carr Island.

The growth of public interest in the conservation of wild life has advanced so rapidly, and now extends to so many local and State activities represented by individual efforts and those of local and State organizations, that it is impossible to mention each single contribution.

An outstanding event was the formation of the "Associated Committees for Wild Life Conservation." This is a council composed of representatives of the Massachusetts Audubon Society, the Massachusetts Fish and Game Protective Association, and the Federation of the Bird Clubs of New England. While the Massachusetts Forestry Association is not officially a part of the council, it has indirect representation through its secretary, Mr. Harris A. Reynolds, who is a member of the Committee representing the Federation. This is the first time in the history of the State that representatives of the principal associations interested primarily in the protection of the song and insectivorous birds, and the sportsmen, have combined their efforts for the protection and increase of our wild life.

During the year a new league of sportsmen's organizations was formed, known as the "Massachusetts Associated Sportsmen, Inc." This League is made up of a substantial number of local fish and game clubs, representing the various parts of the State.

It is very heartening to report this increased activity of the rank and file of our people who are interested in one phase or another of wild life conservation. Thorough organization, under wise, conservative direction, is the surest guarantee of continuing advance in the right direction.

ENFORCEMENT OF LAW

In accordance with the announced policy of the Division, renewed and vigorous efforts were made during the year to effect a more efficient and complete enforcement of the fish and game laws. The result is evidenced by an increase in the number of convictions, together with an increase in the revenues through the medium of court action. But the results of this policy are more clearly shown in the satisfaction expressed by the law-abiding sportsmen, who have come to realize the importance of apprehending and convicting violators of the laws if their sport is to be maintained at its highest in this Commonwealth.

In order to accomplish the best results, a change was made in the policy of administering the law enforcement work. Chief Warden Orrin C. Bourne was relieved of the routine of office work so that he could de-

vote his entire time to active field work. He will continue in the future, as he has done this year, to take active charge of the field operations, and will supervise any important law-enforcement activity as well as to conduct independent investigations.

The office and administrative work of the law enforcement section will, in the future, be in charge of Raymond J. Kenney, Deputy Chief Warden. He is assisted by Miss Irene V. Lydon, who has been transferred to the law-enforcement personnel from the general office staff, a promotion earned through two years' efficient work in her former position.

Several changes were made in the personnel of the law-enforcement unit by reason of death and retirements. Warden John F. Luman of Palmer died on August 16 after a brief illness. He was one of the oldest wardens in point of service, having been appointed in 1900. At one time he served as Chief Warden, which post he relinquished voluntarily. At all times he was rated as one of the most efficient men of the force, and was held in high esteem by the sportsmen and general public in his district. He was succeeded by Mr. Carl G. Bates of Westfield, who has established headquarters in Warren.

Warden William H. Leonard of Walpole was retired on January 6, having reached the maximum age of seventy years. He had served the department faithfully for seventeen years, and left behind him a commendable record of public service. He was succeeded by Warden Willis E. Chase of Mansfield.

Warden James P. Hatch was retired on June 1 because of physical disability, received in the line of duty, which incapacitated him for further work. Warden Hatch had an excellent record of twenty-one years of service which it will be difficult to equal. Herbert N. Battles of Westminster succeeded him as warden for the Springfield district.

Warden William H. Jones of Nantucket on July 1 tendered his resignation. Karl Eckert of Westfield succeeded him, establishing his headquarters on Martha's Vineyard. It will be the policy of the division to locate the warden for that district on Martha's Vineyard rather than Nantucket, for it is apparent that the best results can be accomplished through this arrangement.

Through the enactment of Chapter 370, Acts of 1926, the Division was authorized to establish a coastal warden service, designed primarily to enforce the regulations of the State Department of Public Health relative to the taking of shellfish from contaminated flats and waters. This situation has become serious from a public health standpoint. Five wardens were appointed under this law, Orin A. Arlin, Byfield, Ernest C. Cloon, Lynn, Daniel E. Ellis, North Easton, Don C. C. Lewis, Westport, and Fred Seaman, Fall River, dating from July 1, and they have been assigned to districts which in total cover the entire coast line of the State. As a secondary consideration these men will devote part of their time to the enforcement of the general laws relative to the marine fisheries as it is the present policy of the Division to separate the marine fisheries and the coastal enforcement from that handled by the regular force of wardens established for inland work. In the five months of their service these coastal wardens, in conjunction with the regular force, arrested 159 persons for taking shellfish from these restricted areas, after due notice to the public as to the necessity for the prohibition in order to safeguard the public health.

The new sporting license law, which eliminated the separate hunting and fishing license, together with the increased law enforcement, resulted in 306 persons being arrested and prosecuted for fishing in inland stocked waters without having secured a sporting license. This class of violation exceeds all others, and as there is no reason why the public should be permitted to deliberately violate the law requiring a sporting license to fish in stocked waters, the Division will continue to exert every effort to curb this practice. In this connection it is interesting to note that there

is no corresponding increase in the number of persons prosecuted for hunting without a license, which indicates that it is the fishermen who make light of the license law.

The court work for the year was as follows: Number of cases, 1,002; convicted, 943; discharged, 58; held for the Grand Jury, 1; (filed, 154, appealed, 78); fines imposed, \$12,961; costs paid, \$179.80. In the case of each conviction the person convicted loses any sporting or trapping license which may have been issued to him, together with his right to secure a license for a period of one year following the date of his conviction. Licenses revoked: resident citizen combination, 3; resident citizen hunting and trapping, 1; resident citizen sporting, 180; resident trapping, 13; alien sporting, 4; minor trapping, 1; resident lobsterman, 1; alien lobsterman, 1; total, 204.

The problem of the alien still continues to be of great importance in law enforcement work. Twenty-four persons were prosecuted during the year, charged with the illegal possession of firearms; all but four were convicted and substantial fines imposed and guns forfeited. One of the defendants received a direct jail sentence. Closely connected with the alien problem are the violations having to do with the killing of protected birds, particularly song birds. Nineteen such cases were prosecuted and \$210 collected in fines.

Twenty-two cases of killing protected shore birds were brought to the attention of the courts, which indicates that a number of hunters unacquainted with the numerous species of the protected shore birds, or who do not wish to become acquainted with them, persist in hunting during the shore bird season. While it is rather difficult to distinguish some of the protected birds, the matter was somewhat simplified this year by the prohibition under the Federal law of the killing of plover. Violations above referred to were actual breaches of the State laws, and did not include those persons apprehended for killing plover contrary to the Federal laws and who were prosecuted in the Federal courts.

The extremely pernicious practice of placing out poison for the killing of birds and animals appears now and then, and, despite the difficulty in securing sufficient evidence to convict under this law, two persons were apprehended and convicted, Wilho Mayranen of Westminster, fined \$300, and Owen Lewis of North Adams, sentenced to jail for three months. This is one of the worst forms of violation we have to deal with, and it is most reassuring to see that the courts will impose severe penalties whenever persons are apprehended for this offence.

While the number of persons prosecuted for fishing without a license greatly exceeds the number of those prosecuted for hunting without such a license, yet of the latter class 91 were brought before the lower courts. In almost every case when a conviction was secured a substantial fine was imposed, which serves notice on the public that the requirement of a sporting license to hunt and fish is an established policy in this State, and that the courts intend to maintain it by punishing severely all those who attempt to evade the law in that respect.

Numerous violations of the trapping laws were prosecuted this year. Under the new sporting license system a separate trapping license is required to follow this business, as it is now considered a commercial proposition rather than a sport. In the endeavor to put this industry on a business basis and build up and maintain it, every effort will be made to rule off the course the irresponsible and lawless trapper, so that this industry may be maintained for those who wish to follow it as a livelihood and who are willing to abide by the laws.

Among the fishermen the leading violations, outside of those concerning fishing without a sporting license, appeared to be the taking of horned pout during the closed season and the taking of undersized pickerel. Fifty-one persons who violated the pickerel laws were brought to justice. In practically every case of violation of these laws there is no

reasonable excuse for it. A fisherman who goes out before the season opens, intending to "beat the game," is a poor sportsman; and the man who goes fishing without providing himself with a suitable rule by which he can measure the fish, is taking an unnecessary chance. The fishing seasons are particularly long compared with the open seasons on game, and for that reason the man who fishes during the closed season is not entitled to sympathy. Some of our most popular pond fish, notably the pickerel, cannot be artificially propagated, and for that reason every effort is made to see that they are protected during the closed season, and that the law pertaining to the legal length and bag limit is respected.

Although the usual spring patrol was not maintained on the smelt brooks this year, occasional raids were made and eight violators apprehended, and fines totalling \$178 were assessed against them.

Despite the handicap in having no boat in which to conduct the work, 40 persons were prosecuted for violating the lobster laws. Eighteen of these were prosecuted for taking short lobsters and substantial fines, aggregating \$571, were assessed. The proper enforcement of the lobster laws presents a difficult problem, due to the absence of suitable boats for the work. The situation is also greatly aggravated by the disposition, on the part of an otherwise law-abiding public, to purchase and use illegal lobsters. So long as the demand for contraband lobsters exists, the matter will be a source of great difficulty, despite the fact that any intelligent fisherman should readily see that the taking of small lobsters will, in time, destroy the industry from which he derives his livelihood. But many of the lobster fishermen are foreign-born, and when respectable citizens eagerly assist them in breaking the short-lobster laws, it is very difficult to instill in them any respect for the laws.

As a whole, the warden force is handicapped because each warden is not equipped with a State-owned automobile with which to patrol his large territory. One-third of the men are still without such independent means of transportation. As the majority of the people who hunt and fish today, and particularly those who are bent on violating the laws, are motorized, the efficiency of the law-enforcement is necessarily below par.

Along with these handicaps is the fact that a great many people who witness violations or who know where such are committed, will not co-operate with the wardens in apprehending violators. Considering the large territory that each warden must cover, it can be readily seen that without a keen public interest and an earnest desire to see that violators are punished, the best results cannot be obtained.

Perhaps this need of an awakening on the part of the public can be best illustrated by mention of this significant fact. Under the law each city and town is empowered to request the appointment of a fish and game warden for that town, and only 75 have taken advantage of this provision. In this one respect the sportsmen throughout the State could render a special service to the cause if they would make certain that the local officials in their municipalities have an efficient and energetic warden holding office. The value of approximately 350 earnest and efficient men, supplementing the regular district wardens, is easy to estimate.

NEW LEGISLATION

The following changes, most of which are more fully discussed under the appropriate headings, were made in the fish and game laws during the 1926 session of the Legislature:

Chapter 19 increased the legal length and reduced the bag limit on trout for a certain portion of the Deerfield River, and authorized the Director to regulate the fisheries in the river.

Chapter 27 increased the penalty for taking illegal pickerel, from one to ten dollars per fish, giving the pickerel the same protection as is given other species.

Chapter 32 placed a five-year closed season on ruffed grouse in Dukes County.

Chapter 50 gave the selectmen of Chilmark additional authority in the matter of regulating fishing in the tidal waters of that town.

Chapter 66 amended the law relative to hunting deer on State reservations by eliminating the provision requiring a special written permit for such purposes. In the future, if a State reservation is opened to deer hunting by the Commissioner with the approval of the Governor and Council, all persons holding a sporting license will be entitled to hunt there.

Chapter 68 gave the cities and towns along the Taunton Great River the right to lease the alewife and shad fisheries in that river for terms or ten or more years.

Chapter 87 repealed an old law relative to the fisheries on Pasque Island, and again vested the control of the fisheries in the town of Gosnold.

Chapter 88 extended further the closed season on hares and rabbits in Dukes County.

Chapter 151 amended the present law to give the Director the right to authorize the taking of woodcock, ruffed grouse and quail for scientific purposes at any time of the year.

Chapter 181 amended the law relative to the killing of hares and rabbits found damaging farm crops, so as to give the farmer the same practical method of protecting his crops that he has for some time been accorded in the case of damage by pheasants or deer.

Chapter 195 authorized the Division to issue permits for the use of large nets for taking shiners and suckers for bait for commercial purposes. This will make available for the fresh-water fishermen, an increased supply of bait.

Chapter 352 amended the sporting license law as of January 1, 1927. It reduced to \$5.25 the present fee of \$15.25 now charged to non-residents of the State. The smaller fee is considered fair, in view of the fact that it has become a definite policy to maintain, in this State, the single sporting license principle. By the same law, non-residents who are entitled to present exceptions because of real estate holdings, will be entitled to a license for \$2.25 instead of the \$5.25 now charged. All minors under eighteen years of age, regardless of citizenship, are given the right to obtain a trapping license; a separate trapping license at \$2.25 is required of trappers, and there are other minor changes.

Chapter 370 gives the Department of Public Health additional authority in protecting the public health through restriction on the taking of shellfish from areas which are found to be contaminated.

EDUCATION AND PUBLICITY

The educational and publicity work of the Division was conducted in a manner similar to other years. The number of illustrated lectures given was somewhat reduced, however, because, on account of more aggressive law enforcement work outlined in the previous section, the greater part of the Chief Warden's time was devoted to that activity. During the time of the year when the unfavorable conditions of the weather limited his field operations, however, he gave 20 lectures before schools, fish and game clubs, and other associations.

The policy of showing exhibits of live fish and game birds was abandoned, with the exception of the usual exhibit of live fish at the State Building at the Eastern States Exposition in Springfield, which lasts one week.

Considerable publicity work was carried on through the press, and a commendable co-operation was shown by the papers throughout the entire State. A particular effort was made to keep the public fully informed of the activities of the Division, and to bring to its attention

necessary information concerning the laws governing seasonal activities in hunting and fishing. In every instance, the press gave liberal space to the articles that we might succeed in arousing public interest in the work and in impressing the necessity for general co-operation in order to secure better enforcement of the fish and game laws.

BIOLOGICAL DEPARTMENT

FIELD WORK

The field work consisted of the installation of new fishways, periodical examinations of all alewife streams and fishways, the restocking of certain of these streams and headwaters with adult fish, and observations especially directed to the return of the young alewives from the spawning beds to the sea. The usual statistics were collected on the alewife and mollusk fisheries. All these activities are more fully described under their respective headings.

The development of wild life sanctuaries occupied a portion of the year. Considerable time was spent on the development of Penikese Island in particular, and a start, at least, was made in the extermination of rats on Milk Island, Rockport. Special attention was given to stocking other sanctuaries and reservations with game and fish, after investigation as to the proper cover and water. Upon request, visits were made to private estates to give advice as to their development into wild life sanctuaries; also on the construction and development of artificial ponds, and on general pond cultural work.

Prospective hatchery sites were viewed, and periodical visits made to the rearing stations of the several sportsmen's clubs which had undertaken the rearing of young pheasants to larger size, and advice given on the care of the birds.

Several cases were investigated of fish dying in ponds.

Any unusual or abnormal condition presenting itself among the fish or birds at the stations was investigated and treatment applied. On the whole, at all stations little or no trouble was experienced. There was no outbreak of any particular disease at any of the stations.

Specimens of fish and birds were received, as usual, for examination and autopsy, and the usual routine pathological examinations made.

Specimens of ruffed grouse for use in the study, begun last year, of the life history and diseases of this bird (see section on ruffed grouse) were received through the central office and forwarded to the investigators, while others were sent direct from the sportsmen throughout the State.

Considerable time was spent in photographing the various phases of our work, such as new fishways, wild life sanctuaries, and particularly the most recent construction work at the stations, thus bringing the photographic files up to date.

DISTRIBUTION

The major activity of the biological department each year is the distribution of the stock produced at the fish hatcheries and game farms, and such as may be imported from outside the State. This necessitates periodical visits to the four game farms, five fish hatcheries, and the pond cultural unit, to see that the former are supplied with their quotas of adult stock from which eggs are collected for the year's operations, and that the latter are furnished with their quotas of eggs and fry to be hatched and reared. It includes, too, the supervision and inspection of this stock until the proper size is reached for liberation, its allotment to the various sections of the State, the planning of distribution details, and detailed office records. The work is described more fully under Fish and Game Distribution.

WILD BIRDS AND ANIMALS

WINTER FEEDING

Cold weather struck in just before Christmas, but it was an open winter except in early February, when several heavy storms piled up the snow and made feeding of the wild birds necessary. During the winter there was no heavy fall of snow on Cape Cod. Although the rest of the State had a few heavy storms, the snow was light and did comparatively little harm to bird life, and there were practically no ice storms. As usual grain was sent out in anticipation of emergencies, to the extent of 243 lots (4,810 pounds).

In addition to the agencies already interested in this work, the country clubs and golf clubs were asked to bear in mind the needs of the birds on and about their grounds. There is a growing activity in the care of life in the wild, and we are beginning to get a fine concentration on this work when emergencies arise.

BREEDING SEASON

While the effect of weather conditions on the breeding of the game will be noted elsewhere, it may be stated in general that the spring was very cold and backward, resulting in a generally unfavorable breeding season.

FIRES

There was no extraordinary drouth condition throughout the entire year. Through the early fall and up to and including the upland game season, sufficient rain fell to remove any necessity of closing the season because of the dryness of the covers.

POSTED LAND

There has been no noticeable change in the amount of posted land. The conditions throughout the State are always "spotty." In one year there will be considerable posted land in a given locality. In time this tendency dies out, only to spring up again somewhere else. It is to the everlasting credit of the land owners of the Commonwealth that the anglers and hunters are given such a free range on our streams and in our covers. Each year we try to impress on the sporting fraternity the need of increasing respect for the property of others, in order to guarantee a continuance of this relationship.

MIGRATORY BIRDS

Song and Insectivorous Birds

Permits were issued to 78 persons for the collection of birds, eggs and nests for scientific purposes. Sixty-nine reports were made, showing 214 birds and 301 eggs had been taken.

The song and insectivorous birds continue to engage our attention as closely as any other group of birds. The interest of the sportsmen in the preservation of these species is increasing year after year, and there is a better understanding all round between our people who are interested primarily in these species, and our sportsmen who, naturally, are especially interested in the game birds.

Migratory Game Birds

Shore Birds.—No one can speak with very great enthusiasm over the outlook for our shore birds. It is doubtful if they are any more than holding their own—considered as a group. There is a slight increase in the smaller species, and in perhaps one or two of the larger species.

On these now classed as game, and on which a hunting season is permitted, the situation is not at all satisfactory.

Plover.—Owing to the reduced numbers of golden plover it has been deemed advisable by the Federal government to declare an indefinite close season on this species. Reports of the black-breasted plover during the past year throughout the United States were so unfavorable that it was deemed advisable to close the season, for the time being, at least, on this species. An additional deciding factor was the similarity in the plumage of one stage of the golden and the black-breasted plover. The closing of the season on both species would more nearly guarantee complete protection to the golden plover.

During the summer and early fall migration, the golden plover appeared on our shores in more than usual numbers. It is very difficult to determine whether this was due to a real increase in the numbers, or to the fact that such plover as appeared lingered longer because undisturbed, and as a result bunched up in more impressive numbers.

The upland plover was not noted quite as extensively as usual.

There was no change in the status of the piping plover.

Snipe.—The spring migration was normal. The fall migration afforded less opportunity for sport than usual. It is difficult to account for this, unless the uniformly mild season caused the birds to drift along slowly and more evenly than usual. Our marshes were in better condition for the birds than is the case in an average year.

Woodcock.—There were heavy flights of woodcock through the spring, not confined to any particular locality, but quite general, and many remained to breed. Apparently the cold, late spring did not affect the woodcock to any great extent, for they are one of the first arrivals and seem to stand all sorts of changes and all varieties of weather.

On the fall flight the numbers appeared to be slightly under normal for the State as a whole. However, it is very difficult to make a comparison between the flight this fall and last, for the reason that last year between the middle and latter part of October there was a very cold spell all over New England, that seemed to push the woodcock along rapidly, with the result that they were somewhat bunched on their migration. This year the weather conditions have been more normal, with the result that the birds have drifted along in the usual fashion. For the foregoing reason, the general impression might prevail that there are less woodcock this year than last, but, taking everything into consideration, it is probable that they are holding their own, though with no appreciable increase.

Rails.—The rail is regarded with indifference as a game bird, and very few are killed. Several species were present in usual numbers.

Sandpipers.—The smaller species of shore birds appear to be slightly on the increase from year to year; but in view of the fact that complete protection is given to them throughout their entire range, it has been disappointing that they have not increased more rapidly.

Winter and Summer Yellow-legs.—While the spring flight was of good proportions, including both species, the late summer and fall migration was very disappointing. The general report from the migration region was to the effect that, general speaking, more black-breasted plover were seen than either summer or winter yellow-legs all through the migration period.

Curlew.—There were not quite so many reports of curlew, compared to the past two years.

Ducks.—The wood duck continues to thrive. While no substantial numbers can be reported, it is evident that these birds are slowly but surely increasing in numbers.

A few mallards are taken each year, but not enough to be any great factor in the volume of sport.

There was no unusual feature to the spring flight of red heads. Up

to the time of this report only a comparatively small volume of birds had come into our territory.

The same applies to the blue bill. It is difficult to account for this gradual lightening of the flight in the past two or three years.

The black duck continues to thrive. We believe it advisable each year to point out the fact that their numbers could be very substantially increased throughout the entire State were it possible to establish and develop wild life sanctuaries especially adapted for the breeding and the holding of them.

But few canvasbacks were noted during the fall migration.

Geese.—From December 1, 1925 through the remainder of the shooting season, the flight of geese increased over the earlier months. This seems to be an increasing annual phenomenon.

The spring flight was of about usual proportions.

The fall flight, up to the close of this report (November 30) was unusually light.

Throughout the entire country reports would indicate that the geese are more than holding their own. But, for some reason, the fall flight on our coast has lightened up during the past couple of years. Very interesting theories as to the cause of this have been advanced. Perhaps one that will bear closest following is—that the airplanes (particularly the mail planes) which are now covering clearly defined air lines day and night, have a tendency to push the birds farther out to sea. This is only another of those developments under the general term of "civilization" which, from time to time, combine to govern the annual life cycle of our wild stock.

The spring flight of brant was of ordinary proportions. Owing to the mild, early season the birds have been drifting along in about usual numbers up to the latter part of November.

Statistics of the Gunning Stands.—Number of stands operated, 80; geese shot, 2,147; ducks shot, 6,305; live goose decoys used, 3,286; wooden goose decoys used, 2,857; live duck decoys used, 2,589; wooden duck decoys used, 2,163.

Migratory non-game Birds—Gulls and Terns

No special work was done for the gulls and terns, except that the Federation of the Bird Clubs of New England is continuing its effort to acquire the most important natural breeding grounds along the coast. Some of these have already been presented to the Commonwealth, as set forth in previous reports, and others still remain the property of the Federation. The Federation also maintained a warden to guard the tern colony on the John B. Paine Bird Refuge at Chatham, a valuable breeding ground of the common, Arctic, least and roseate terns; employed a warden to post and guard the tern colony at Weepecket Islands; and contributed to the salary of a warden to do the same for the birds at Dry Shoal and Muskeget. (See also report on Penikese Island Reservation).

Federal Control of Migratory Birds

In the last report mention was made of the committee (representing the American Game Protective Association, the Izaak Walton League of America, the Western Association of State Game Commissioners, the National Audubon Societies, and the International Association of Game, Fish and Conservation Commissioners) which was preparing a new draft of the Game Refuge Bill, aimed to unite the sentiment of all sections of the country on the measure. The bill finally agreed upon, substituted for the federal license fee, a federal sales tax on sporting arms and ammunition. This method of raising funds did not, however, meet

the approval of the Administration at Washington, and when that became known, the committee filed a report to the effect that it was impossible to accomplish the object for which it was appointed, and disbanded.

Subsequently, at a meeting in Washington of representative conservationists from all parts of the country, the members of the above committee were asked to continue to serve as a committee in charge of the campaign for the passage of a Game Refuge Bill. A bill embracing most of the features of the original Game Refuge Bill, with some modifications intended to clarify the act as a whole, was introduced in the first session of the sixty-ninth Congress.

This bill was discussed at some length in the Senate, but action on it was postponed by dilatory tactics on the part of two or three Senators who were opposed to it, and thus a vote was prevented in the closing days of the session, although a poll of the Senate revealed that there was a sufficient number of Senators favorable to the bill to have enacted it had it come up for a vote. The bill was not brought up for a vote in the House—it being thought desirable for the Senate to pass on it before it was discussed in the other branch.

During the summer and fall the committee was engaged in considering further action in the interest of this legislation.

As time goes by and the American people continue to haggle over this question, the more apparent it becomes that the remedies proposed in this bill must be put into effect. It is useless to talk of preserving the many species of water fowl through restriction after restriction on the sportsmen, while standing idly by and permitting the breeding, feeding and wintering areas to be rapidly wiped out of existence.

We are familiar with the making over, in this State, of thousands of acres of such breeding and feeding areas into cranberry bogs; also the drainage of large swamp areas that were formerly the haunts of millions of these birds. The gunner never permanently removed those birds from our State. That was done by the encroachments of civilization. The shooting would have been only a passing phase had the breeding grounds been maintained—if only in part. The same thing has occurred in a great many other regions of the United States in localities even more favorable to those species. It is continuing with uninterrupted speed in other localities which, up to the present time, have been largely unmolested by man. Unless these conditions can be remedied by saving a portion of the breeding and feeding areas which are left, and restoring others, while at the same time making adequate provision to winter these birds on protected areas in the southern States, it is idle to talk of maintaining the wild life supply.

UPLAND GAME

The Hunting Season

From start to finish the hunting season may be characterized as normal. Sufficient rains removed any possible fire hazard. While the early part of the season was quite warm and there was more than the usual amount of rainfall, restricting somewhat the opportunities for sport, viewed as a whole it was satisfactory. The unusually steady, mild weather lightened up the woodcock flight and in general delayed the usual seasonal movements of the wild life as a whole.

Pheasants.—There is nothing unusual to record in connection with the pheasant. There was a plentiful supply of breeders and a good production. The pheasant is so firmly established and so hardy that, with an annual substantial stocking, they would continue to maintain their numbers reasonably well. The policy of bringing the greater proportion of the product of the game farms to maturity before liberation is well under way, and this year the proportion of immature stock lib-

erated is comparatively small. This end is accomplished either by retaining the birds at the State game farms, or arranging for clubs and individuals to carry them through the winter until spring. Though this plan entails more expense for feed, the matured product is many times more valuable than the young stock, and the project has the approval of the sportsmen. (See Game Distribution).

It is gratifying to note that there is little demand for an open season on hen pheasants. As the birds become more abundant this demand is likely to increase. On the other hand, the very existence of a good volume of sport depends on the presence of a large stock of hen pheasants in the covers, and we believe that any open season on hen pheasants for some years to come would be a very grave mistake. It is entirely possible that in a given year, because of unusual scarcity, the season might be closed on one or more other game birds, during which time, serious consideration would be given to opening the season on hen pheasants as a compensation to the sportsmen for the large sum which they are annually investing in the maintenance of sport. While it is a fact that the pheasant is artificially propagated and that the number liberated each year depends entirely on how much money can be invested in the project, nevertheless it takes a long period of time to firmly establish a good breeding stock of hen pheasants in the covers. This brood stock is the surest guarantee that in the years to come we will have increasing opportunities for sport.

The total number of pheasants reported shot in open season was 2,927, divided according to counties as follows: Barnstable, 13; Berkshire, 78; Bristol, 213; Essex, 447; Franklin, 92; Hampden, 274; Hampshire, 215; Middlesex, 505; Norfolk, 288; Plymouth, 284; Suffolk, 2; Worcester, 502; locality not reported, 14.

Ruffed Grouse.—The winter was not one which would impose any particular hardship on the grouse. There was a good-sized brood stock left over from the previous open season, and in the spring the covers (with local exceptions) were populated with at least an average number of grouse, and in many cases better than average. The breeding season was late, and the weather cold, though dry. There was an excellent production of young, and during the summer many flocks were seen, of small or average size through the eastern and central sections of the State, and large broods farther to the west. There was every reason to anticipate a good supply of birds for the fall shooting, but in late summer this condition suddenly changed, and where grouse had been seen commonly, a scarcity became apparent.

At the opening of the hunting season the weather was seasonable. The swamps and lowlands were pretty well dried out, but no fire menace existed, for there had been several rainstorms and snow lay on the ground in some parts of the State. There had been no heavy frosts, and the foliage still hung thick on the trees, making hunting difficult.

The grouse were very wild and difficult to approach, and widely scattered. The reports of the numbers of birds seen were conflicting. Some hunters reported them plentiful, but the majority inclined to the statement that very few were seen, and those mostly old or adult.

As the season went on, the most favorable reports on conditions came from Worcester county. At any time when the status of a species is under consideration we are bound to find "spotty" conditions. Even in 1919, when the season on grouse was closed for a year because of scarcity, the birds were reported in even more than normal numbers in some sections of the State. It may well be that the central part of the State is favored this year. It is a common experience to have the birds reported as scarce and widely scattered through the earlier part of a season, and then, toward the close, to receive reports that they are showing up in substantial numbers in the very localities where earlier scarcity existed. The grouse is a hardy bird and does not hesitate to

travel substantial distances for food. While it feeds on a variety of things, nevertheless it is partial to certain foods and will travel long distances to obtain them. In the early part of the season there is usually a generous food supply, widely scattered, and as a result, the birds are also thinly distributed. As the season advances and the food supplies are consumed (not only by partridges but by other birds) or decay, and as the cold weather makes large stretches of the country less attractive, the birds localize in favorable places.

While the later reports indicate a larger number of grouse than seemed to exist at the opening of the season, nevertheless the smallness of the stock, taking the State as a whole, is sufficient to cause concern.

This season marks the beginning of the five-year closed season on grouse in Dukes County, provided by Chapter 32, Acts of 1926, which was enacted on request of the local sportsmen. In view of this evidence of interest in their report, the Division made an effort to purchase grouse for liberation so that the increase of the birds might be hastened. Though inquiries were made even in the Canadian Provinces, no source of supply could be located. Arrangements were made with several trappers in western Massachusetts to collect a few specimens in their localities, but for one reason or another none were obtained.

Concerning the progress of the study of the ruffed grouse, mentioned in the last annual report, Dr. A. O. Gross writes:

"The special study of the ruffed grouse in New England, which is a part of the general investigation covering the entire range of the bird in the United States and Canada, is being continued under the direction of Dr. Alfred O. Gross, Bowdoin College, Brunswick, Me. Dr. E. E. Tyzzer of the Harvard Medical School has charge of, and is directly responsible for, the diagnoses of diseases and determination of the parasites. The sportsmen are taking an increased interest in this work, due largely to the activities of the Massachusetts Fish and Game Protective Association and the New England Grouse Investigation Committee under the chairmanship of Dr. John C. Phillips.

"Since the investigation began, over a thousand specimens of ruffed grouse have been received at the Bowdoin laboratory for examination. Sufficient material has now been examined to enable the investigators to determine the relative importance of the various diseases and parasites in the different sections of New England. The examination of material received this year has not been completed, but there seems to be a decline in the number of diseased birds, and the peak of destructiveness of these diseases apparently has been passed for this period. A report of progress, published in June, 1926, outlines the work done up to that time.

"Not only disease, but every factor which in any way affects the life of the ruffed grouse, is being carefully considered. The detailed determinations of the food of the thousand specimens is being done by the United States Biological Survey. Life history studies are conducted in the field at Brunswick, Me., where the various environmental factors in relation to the birds, especially the young, are given attention. Several weeks were spent in northern Maine, a part of New England which was reported to be seriously depleted in numbers. Sixty percent of the birds collected in that region were heavily infested with ticks. The large number of foxes and other predaceous animals were found to be an important factor in northern Maine. At the present time (winter of 1926-7) the great migration of goshawks and snowy owls is being studied, and the examination of several hundred specimens is expected to yield definite information concerning the effect of these predaceous birds on our game."

Quail.—In the quail country a large stock was left over from the gunning season, and they came through the winter with little diminution in numbers. The quail are now so carefully sought out and fed

by sportsmen and associations that the losses from severe winters has been partially guarded against. In the spring a noticeably large number of quail were heard calling. The season being late and the weather colder than average, some of the early hatches were light, but evidently the year's production was excellent, for at the opening of the gunning season quail were found to be more numerous than had been the case for many years. There was a noticeable and unusual number of very young birds, too small to shoot, apparently from late hatches.

On Martha's Vineyard the quail wintered most satisfactorily; not many had been shot in the previous season, and in the spring the island was well populated. Large broods of young were reported.

In seven of the fourteen counties there is now a complete close season on quail—Essex, Hampden, Hampshire, Middlesex, Nantucket, Norfolk and Worcester.

In Essex County the season has been closed since 1914, owing to the almost complete extermination there of quail. Limited stockings were made from time to time, with apparently no results. In recent years there have been reports of a few quail here and there, and this year there is reason to feel that they may again become established, for from ten or a dozen towns came well-authenticated reports of quail, not only small flocks but bevies numbering 10, 15 and 20 respectively.

It is especially pleasing to be able to report an increased number of covies in Worcester County and to the westward.

Deer.—In the deer season falling within the period of this report (December 7-12, 1925) the record was below that of 1924. In the latter year conditions were ideal from the standpoint of the hunter; but in 1925 conditions favored the deer, for the absence of snow made tracking difficult, the brush was dry and noisy, and the swamps were filled with water. On the whole it was good hunting weather, mostly clear, crisp and cold, though with a couple of days of high winds. Many hunters were afield, and, considering the circumstances, they had good success. The laws concerning the use of rifles and dogs were well observed. This was the first year of the two-year closed season on deer in Essex County, which was established on the request of the sportsmen of that county.

The Myles Standish State Forest Reservation, which had been a protected area so long that the deer had increased to such numbers as to cause serious damage to the nursery stock, was thrown open to deer hunters, and 34 deer were taken in the reservation.

The total number of deer shot in the State (including the above 34) was 1,340 (735 bucks and 605 does) divided by county as follows: Barnstable, 161; Berkshire, 339; Bristol, 46; Franklin, 180; Hampden, 171; Hampshire, 117; Middlesex, 8; Norfolk, 8; Plymouth, 159; Worcester, 151.

Good numbers of deer were left over from the open week, and survived the winter well, except that when the snow was deepest a number were run down and killed by dogs. This occurs yearly. Large numbers of fawns and young deer were seen through the spring and summer. Though they are unevenly distributed, the deer maintain their average numbers over the State as a whole, and in certain sections are increasing.

Deer shot while damaging crops numbered 90; and towns were reimbursed by the Commonwealth for claims paid for damage by deer to the amount of \$15,702.77.

Squirrels.—The beginning, noted last year, of an increase in the gray squirrel population, following the marked scarcity resulting from the dying of the chestnut trees in the State, has continued, and in most parts of the State squirrels are now present in far greater numbers than for many years. They have apparently adapted themselves to the changed conditions. The fact that they are not generally hunted as a

game animal, except by young hunters, has facilitated the restoration of the stock.

Hares and Rabbits.—The breeding season was favorable, with the result, based on a good carry-over of stock, that there were as many hares and cottontails in our covers as has been the case for many years.

One of the great difficulties in planting the hares which we import for general distribution, is the selection of suitable cover. Year after year we have liberated substantial numbers of white hares in the eastern portion of the State, with no result. The conviction is growing that most of the country east of the eastern boundary line of Worcester County is not suitable for white hares. There are a few exceptions, but, taken as a whole, this region would yield much better results if stocked annually with cottontails. The stocking that has been carried on in the natural white hare country has produced satisfactory results, and is an indication of what might be accomplished were funds available to purchase more of them each year. The cottontail is easier to produce. It has been found, by our experiments on Penikese Island, that if some sanctuaries, particularly suited to them, could be set aside, we could annually grow quite a stock for general release.

In initiating legislation to bring about a shortening of the rabbit and hare season in Dukes County (permitting their capture only from November 15 to February 15 instead of from October 20 to February 15), the sportsmen of that county have set an example which the rest of the State might profitably follow. There is no species of upland game in the United States which will stand as long an open season as the general law in Massachusetts permits on rabbits, and the sooner the sportsmen realize this, the sooner will there be a reasonable supply of these animals for sport. Following this restriction in the season the Division liberated a couple of hundred cottontail rabbits on Martha's Vineyard—63 on the Heath Hen Reservation and 154 on the open areas. Previous stockings have demonstrated that the cottontail is the only form of hare or rabbit suited to the island. With the conservative shooting proposed, and with annual stocking, this sport should be well maintained and increased.

In order to give proper protection to farmers and orchardists Chapter 181, Acts of 1926 was enacted, permitting the trapping or killing of hares or rabbits at any season if damaging trees or crops—written report to be made to the Director of this Division within twenty-four hours.

A disease having been reported among the cottontails in the western states, it was deemed advisable to inspect any shipments brought into this State. Therefore the public, and particularly the sportsmen's associations, were notified that, under existing law, a special permit must be obtained from the Division for the importation of such rabbits. These permits require the retention in quarantine of all cottontails for a period of ten days, within which period, we are advised by the Federal authorities, the disease would have run its course.

Fur-bearing Animals.—An amendment to the license law (Section 3, Chapter 352, Acts of 1926) requires licensed trappers to report their catch on forms furnished by this Division, between January 1 and 30 in each year, for the previous calendar year. This should make for more complete and uniform reports. The returns under the new arrangement show, for the calendar year 1926: Number of reports, 1,120; muskrat, 15,207; mink, 1,006; skunk, 4,697; red fox, 1,869; gray fox, 79; cross fox, 7; raccoon, 600; weasel, 477; otter, 22; total, 23,964.

The establishment of a special trapping license at \$2.25 by the above act has been previously noted.

There are points of view and opinions prevailing with the sportsmen on the one hand and the trappers on the other, which probably will never be completely reconciled. In common with regulation of the tak-

ing of other forms of wild life, there will always be arguments as to the proper open seasons. The amount of fur taken each year represents an economic return which should be maintained, and increased as far as possible, consistent with maintaining a suitable balance in our wild life. The price of desirable pelts is equivalent to putting a bounty on the heads of these animals, and from that angle we should be alert to watch the stock.

There is a pronounced sentiment in the State in favor of a year or two of close season on the muskrat, on the ground that this animal has never recovered from the excessive killing which took place several years ago when the skins were bringing an extraordinarily high price. In some quarters there is a feeling that the open season on raccoons, by which they may be taken with dog and gun (but not trapped) in the month of October, should be shortened up, so that the trapper and hunter start with equal opportunities. We mention these items as showing the necessity of very careful study of the fur-bearing animals in the years to come.

ENEMIES TO GAME

Cats

We continue to repeat the warning concerning the destruction of wild life each year by wild hunting house cats. The legislation on this subject proposed in past years has not been accepted seriously, but the conviction is growing that, unless some method is devised to restrict the large number of useless cats now to be found in the State, we will be rewarded by a diminishing game supply. We believe if this matter were taken hold of seriously by all parties interested, particularly the rural landowner, some method of control could be worked out that would not be prejudicial to the use of the cat for the control of rodents in and around buildings.

Last year (by Chapter 199, Acts of 1925, amending Section 90, Chapter 131, G. L., the bounty on wild cats, Canada lynx or loup-cervier was increased from \$5 to \$10. During 1926 the county treasurers paid out \$835 in bounties on 85 wild cats (3 at \$5 and 82 at \$10). These cats are on the increase, and are gradually extending their range. If these conditions continue another year, we should give serious consideration to further increasing the bounty in order that it would afford some incentive to the systematic trapping and hunting of them.

Hawks, Owls and Other Vermin

There has been no invasion of the State by any of the northern hawks and owls for a number of years; but in early October goshawks began to make their appearance, and continued to come in increasing numbers. They were followed by the large Arctic owls, and by November both were more in evidence than for many years. No such numbers have been present, especially in such mild weather as was prevailing, within the memory of the hunters. Numbers of the birds were killed by sportsmen and others,—many being taken in the act of killing fowl, pheasants, partridges, ducks and other game, and many were brought to the taxidermists for mounting. Such a visitation only occurs when food scarcity or other conditions drive the birds down from their usual haunts.

RESERVATIONS

Martha's Vineyard Reservation

As usual the winter of 1925-6 was devoted primarily to the destruction of vermin. Patrol work on the reservation during the rabbit season kept off any hunters from the protected area.

Dr. A. O. Gross, under the auspices of the Federation of the Bird Clubs of New England, arrived at the reservation on March 27 for a census of the heath hen and a few days' study of the birds. With all the care exercised in searching for the heath hen the past winter by more people than in previous years, no more were discovered than for the same period last year. In the census by Dr. Gross, assisted by Superintendent Keniston, Mr. Arthur L. Clark and Warden Edward McLeod, fifteen heath hen were actually seen, and the estimate of the probable number on the island was set at thirty-five. The birds have probably held their own during the past year, and possibly a slight increase is shown.

In the spring, three acres of clover were seeded down, and the crop made good growth. On June 22 two long strips were planted, covering in all (with a later planting of buckwheat) about one thousand yards in length and about 15 feet wide. This was with the idea of attracting more heath hen to the reservation, where they would receive the direct attention of the superintendent. Green food and seed food was planted, namely, millet, peas, beans and beets. Unfortunately no heath hen visited this part of the reservation. Only quail and mourning doves have been observed on these planted strips. Superintendent Keniston is attempting, by every means, to bait the birds to this field, but as yet has not been successful.

The weather during the breeding period of the heath hen was average, except severe frost on June 21. No broods of young heath hen were seen by the superintendent, and he heard of only one brood which might have been heath hen chicks.

On November 20 the superintendent saw eleven heath hens on the farm of James Green in West Tisbury, where they had been feeding in the weeds in his garden plot through the season. These were the only heath hen seen by the superintendent during the fall, and none were seen on the reservation or on the Cromwell property since July.

The Federation of the Bird Clubs of New England continued to demonstrate its interest in the preservation of the heath hen by continuing to maintain a warden on the island for patrol and the extermination of vermin.

With the view of diverting the attention of some forms of vermin from the heath hen, 63 cottontail rabbits and 6 Belgian hares were liberated on the reservation. Should they increase, it will form a reservoir from which stock can be trapped for re-distribution in the event of a shortage of cottontails on the island in future.

There was only one fire during the year—on May 13. It burned over about $5\frac{1}{2}$ square miles, but heath hen were not accustomed to collect on any part of this area.

The usual number of visitors called during the summer—62 signed the register and as many more left without signing.

Throughout the year the superintendent maintained a trap line from Menemsha to Edgartown and over the reservation, and the vermin taken by him for the year is as follows: 75 cats, 39 crows, 21 hawks, 82 rats (with many more killed with rat poison and gas). Stomachs of a large portion of the vermin were saved and shipped to Dr. Gross for examination. In every possible way we have co-operated with Dr. Gross in his studies. Trapping of vermin was also carried on throughout the year by Warden McLeod, who was employed by the Federation. From Dec. 1, 1925 to Nov. 30, 1926 (the period of this report) he destroyed: 45 cats (and 5 unborn kittens); 29 rats (and unknown numbers poisoned); 16 hawks; and 12 crows. He did no trapping in November.

In connection with the vermin problem, at the instance of the Heath Hen Committee of the Federation of the Bird Clubs of New England two agents of the Biological Survey at Washington, D. C. visited Martha's Vineyard and from November 7 to 16 carried on an investigation of the

rat situation on the island. Practically all parts of the island were visited, as well as the towns and many of the farms. The following extracts from the report indicate their findings:

"The important result of the investigation, from the standpoint of the extent of the rat infestation on the island, was the finding that the rats are not abundant as reported. Coming to the island, as we did, direct from a series of rat and field mouse control demonstrations in various places throughout Massachusetts and Rhode Island, it was strikingly evident that the rat infestation on the island was less than at places visited on the mainland.

However, the fact that rats were not found abundant in November was not assumed by the investigators to be proof that they were not unusually numerous the preceding June, and farmers and others were interviewed. The report continues,

"From all the data presented, however, it seems probable that rats as a whole were somewhat more abundant than usual during the summer, but that parasites or disease, or other natural causes, have reduced their numbers to below normal at the present time. This fluctuation in numbers is in common with all wild animal life, but is more pronounced in the more prolific species such as the house rat, rabbit and field mouse. This theory was strengthened by the amount of old rat working in evidence, in comparison with that showing fresh sign."

As to the claims advanced that our campaign of destruction of cats and hawks will result in the increase of rats, the report states:

"It is the writer's opinion that this will have little or no bearing on the rat population. It was found that the scrub oak plain where the stray cats are trapped is heavily infested with meadow mice and white-footed mice which have little economic importance. The cats probably subsist largely on these mice, and this undoubtedly accounts for the large number of cats ranging the area. It is unlikely, under the circumstances, that the cats would feed upon or kill many rats, even if present in large numbers, although it is highly conceivable that they would prove very destructive of ground nesting and ground feeding birds, particularly during the nesting season. It was found, however, that there are relatively few rats on the island far away from human habitation, wharves, dumps, etc., and that the cats trapped are for the most part, not those owned by residents or kept for the purpose of combating rats and mice around home premises, so that the destruction of cats roaming the plain could not well have much influence on the number of rats."

Concerning the rat problem in its relation to the propagation of the heath hen the report states:

"Due to the scarcity of the heath hen and the difficulty in locating the nests, the extent to which rats prey upon the eggs and young birds will possibly never be definitely known. Also on account of the little time available for study of the rat occurring on the scrub oak plains and its relative scarcity, it was not possible to determine its status there. That they are not numerous was evident, but that they do occur in most unlikely places throughout the plains, at least near the roads, has been proven by their having been taken in Mr. McLeod's and Mr. Keniston's traps at all seasons of the year. They are also occasionally run over by autos long distances from buildings or cultivated fields. It is quite possible, however, that these may have been traveling or migrating rats.

* * *

"It is doubtful, however, that rats play any important role in the heath hen's struggle for existence. The areas in which the heath hen presumably nests are unsuited for house rats and it is unlikely that many of them come in contact with the birds during the nesting season. During our several inspections of the scrub oak plains surrounding the reservation (during which five heath hens were seen), no signs of rats were found, except, of course, at all occupied buildings."

In the course of the investigation certain farms were cleared of rats by the use of poison, much information disseminated among the residents of the island as to methods of vermin control, and a supply of poison was left with Warden McLeod for treating infested areas.

Penikese Island Sanctuary

The development of Penikese Island as a sanctuary was continued, and the restoration of the island to its natural state, commenced in 1925, was carried forward as funds would permit. In December of 1925 the caretaker's house was painted inside and out, a plank walk laid to the shore house, and a heating system installed. One-half the cost of the latter was paid by the Federation of the Bird Clubs of New England. In November of 1926 the biologist and the caretaker burned all of the buildings on the west side of the island, formerly used by the lepers, as well as the barn buildings on the east side, and all other wooden outhouses except one or two used for farming equipment and grain storage. There still remain to be wrecked, the partly demolished concrete Administration Building and the concrete laundry building.

During January, February and March, flocks of ducks and geese, stopping on the island during migration, were fed grain daily, and the decoy ducks and geese were tethered out as a further attraction.

One of the objectives in developing Penikese Island is to make it a way-station for wild water fowl on migration. To this end we are developing a supply of fresh water and have grain available at the most attractive locations for such birds as may come to the island. A daily record is kept of the visitations, but this is too voluminous for publication. In the early part of December flocks of geese were observed flying low over the island and apparently interested in our decoys. A few flocks appeared off and on during the period from December 7 to April 22. At different times small families of geese alighted on the island, and in one instance (April 3) 63 geese spent the night on the west side.

The ducks (black duck) were somewhat less wary. For example, between January 1 and 6, two hundred were on the island constantly. On some occasions of heavy weather as many as 200 would come to the island. We believe, if we continue the systematic maintenance of decoys and feed, we will eventually be entertaining increasing numbers of geese and ducks on this sanctuary.

The 10 decoy geese raised 5 young, and the 8 call ducks 15, all of which were retained to follow the calling of their parents.

The terns arrived in somewhat scattered numbers, from April 26 to May 15, and remained until August 15. Practically no young were reared, due partly to the heavy storms and the extreme backward spring. The few birds hatched were probably killed by the very heavy rain and cold weather; and the very large number of rotten eggs was undoubtedly due to the extremely damp, cold weather during the period when the terns were on the island. The scarcity of small fish in this vicinity and the lateness of their arrival necessitated long trips by the parent terns for food, and may have resulted in neglect of both eggs and young.

Of the 59 quail liberated in 1925, only 3 females and one male remain at the close of this report.

The 79 cottontail rabbits liberated in 1925 have increased to hundreds, and it is planned to trap a portion in early 1927 for distribution on the mainland. Twenty-four, shipped to the Fall River Rod and Gun Club for a field trial, were later liberated. The white hares have gradually died off, and, as the island affords no proper cover, it is planned to remove them.

Considerable progress was made on the development into a pond of a large swamp area on the northerly point of the island. Work was begun by the caretaker by digging a trench 200 x 5 ft. and 4 ft. deep.

This trench will be continued, from time to time, and with the spring rains the ducks and geese themselves will do considerable to work this pond. The swamp is fenced with posts salvaged from the partly wrecked buildings, and new wire purchased for the purpose.

A piece of cultivated land was fenced in and planted to turnips, rutabaga, cabbage, beets and potatoes, for winter rabbit food, but the young rabbits got through the wire and ate most of the vegetables. A section adjoining the garden was also fenced off as a holding yard for hares and cottontails before shipping.

25 four-year old Scotch pine, 25 Norway spruce, and 50 5-year old Arborvitae, obtained from the Division of Forestry, were planted.

Attention was given to exterminating vermin, resulting in the destruction of thousands of garter snakes and a large number of crows and hawks, together with 6 great white owls.

OTHER SANCTUARIES

There is no special report to be made on the other State-owned sanctuaries. Without active administration on our part, they serve as natural breeding grounds and refuges for the species to which, by their physical make-up, they are adapted. As time goes on it is anticipated that money will be available to do the things which need to be done to make them more suitable, but until then, any extensive development must remain in abeyance. Appropriations for such work have been asked in the 1927 budget.

The buildings on the Henry Cabot Lodge Bird Sanctuary (Egg Rock) should be removed, and, lacking divisional funds, an effort is being made to either interest the local bird club to raise the funds, or to locate some concern which would do the work for the salvage value of the material.

On the Knight Bird Refuge Sanctuary (Milk Island) a campaign was begun for the extermination of the rats and snakes which infest it, by the use of calcium cyanide—which, pumped into the holes, releases a deadly gas. The process will be repeated at intervals until the island is free from vermin.

On the Isaac Sprague Bird Sanctuary (Carr Island) the remaining buildings (except the residence) should be removed and a suitable dam built, in order to flow the pond. This latter development will permit of the making of a substantial fresh-water pond on a small island, located out in the salt water. It is apparent at once that this should be a splendid stopping place for many kinds of water fowl on the annual migrations. There is a splendid opportunity for enlarging the supply of food-bearing trees and shrubs to be an attraction to all kinds of song and insectivorous birds. The rabbits liberated on this sanctuary last year have already increased.

There is nothing of special note concerning Ram Island and Mount Watatic Sanctuaries.

Reservations under Sec. 69-75, Ch. 131, G. L.

The term for which the Hingham Reservation was established expired April 25, 1926.

INLAND FISHERIES

GENERAL

The sentiment is gradually developing in the State for further restriction on the fishing in our inland waters, particularly our great ponds. Most of the pond fish cannot be artificially propagated, and we are compelled to rely almost entirely on the natural reproduction to keep up the supply. The shores of our ponds are rapidly being lined with camps, which are utilized not only in summer, but increasingly so in the winter.

The ponds, too, are becoming more and more accessible through good roads. The fish life in these ponds will continue to gradually decline until such time as they are relieved of some of the present drain of excessive fishing. In the main we have comparatively short seasons on our upland game, and even with this rigorous restriction, it is no more than holding its own. Today most of our pond fish may be taken for 10 months out of the year, and during part of this period, including the intensive winter fishing through the ice, with 10 traps to a fisherman.

Our suggestion to reduce the number of traps to 5 per fisherman has not met with public approval. Neither has the suggestion to substantially curtail the period of winter fishing. This year we submitted a questionnaire to the fish and game associations on the proposition to stop all fresh-water fishing (except for brook trout) from January 1 to July 1, but it was overwhelmingly opposed. In 1924 the law was passed authorizing the Division, upon petition of the selectmen of the towns wherein the ponds are located, to set off not to exceed 25 per cent of a given great pond to be a closed breeding area. Although this act has been called to the attention of the selectmen on several occasions, no action has been taken by any board that has resulted in establishing a single closed area.

There has been some suggestion of a further restriction on the catch, and a raising of the legal length of most species. We do not believe that such regulations will meet the need for further protection.

It is encouraging to note that this year there was more sentiment expressed in favor of some further restriction than has been observed in many years. As the public attention is directed to the problem we believe that action will be taken. But it is useless to talk of improving the fish or game supply by any method of artificial propagation, or pond cultural work, or salvage work, until we have set our house in order to the extent of giving the natural stock in the waters or covers a reasonable opportunity to do its full share of natural reproduction.

BROOK TROUT

The brook trout fishing season was the most unattractive and least productive in many years. In the early part of the season the weather conditions were very unfavorable. Cold, raw, northerly and easterly winds prevailed; the streams were swift, swollen with snow water, and overhung with ice; swamps were filled with water, in many cases frozen, and in many sections there was a considerable depth of ice on the ponds. Over a substantial part of the State the snow still lay deep, roads were impassable, and it was difficult to reach the streams. There were, of course, a few brooks where conditions were more nearly ideal.

Wardens patrolling the streams reported meeting a far smaller number of fishermen than usual, and only a small proportion had fish. By the first of May the weather warmed up and conditions approached normal; but thereafter the dry weather reduced the flow in many brooks so as to prevent the trout from going far upstream. On the whole, the season was a disappointment, and what good catches were made occurred mostly in the larger streams, the particularly choice brooks, and the special holes known to the veteran fishermen. Berkshire County proved an exception to the foregoing statements, for there, although the season was late, there were good catches and large-sized fish secured after the season warmed up.

In previous reports we have stressed the advisability of changing over our trout cultural methods by reducing the number of fingerlings distributed and increasing the number of trout large enough to be caught when planted. With the funds contributed by the fish and game clubs, together with a small appropriation, we were able, last year, to enlarge the pools at some of the hatcheries and construct new ones, thereby making it possible to carry, through the past winter, a larger lot of se-

lected fingerlings, to be liberated this year as trout large enough to be caught when planted. During this year there were planted 126,383 yearling and adult trout, (including brook trout and brown trout), which ranged in size from 6 to 10 inches.

Additional construction work at the stations, hereinafter detailed, has increased these facilities, with the result that at the time this report closes (November 30) there are being carried over upwards of 335,000 selected fingerlings (brook, brown and rainbow) to be planted next spring as mature fish.

The distribution of this number of trout will be a very large undertaking, particularly in the central and western parts of the State, where many streams will be inaccessible before, and even after, the opening of the season, on account of snow and ice on the roads. The handling of these fish will tax the ingenuity of us all, and it may become necessary to defer many of the shipments to the western part of the State until the open season is well advanced, or until after the close of the season in the early fall.

On the other hand, if the plantings are delayed until fall, we may be confronted with severe drouth conditions that will reduce many of our streams which are in splendid condition to receive fish in the spring, to a series of large pools. The placing of the fish in these pools in the fall presents a great temptation to poachers and an attraction to vermin of all kinds.

The ideal plan would be to scatter the fish very thinly over large reaches of the bigger waters and principal brooks during the month preceding the opening of the season, or of making very late plantings before the freeze-ups and snows of the winter. This latter plan has its disadvantage, in that we are placing artificially propagated trout in our waters at the beginning of the winter when the food supply is reduced to a minimum, as is the protective vegetation. When the time comes that the Division is equipped with a sufficient number of fast trucks, manned by fish messengers, and the planting is done entirely by skilled hands, many of these difficulties will be overcome.

Regulation of Fisheries of the Deerfield River

The enactment of a law regulating trout fishing in the Deerfield River represents a commendable effort on the part of the organized sportsmen of a given locality to place limitations on their own sport for its preservation and betterment. The Deerfield River is an excellent trout stream, containing fish of large size, and affording fly fishing. The feeling of the local fishermen that, by judicious regulation, the fisheries of the river could be developed to a high standard of excellence, took form in a bill introduced by the League of Franklin County Sportsmen's Clubs, which became a law (Chapter 19, Acts of 1926). It provided that no trout less than 12 inches in length should be taken from that part of the Deerfield River lying between Shelburne Falls and the State line at Sherman, Vt., and established a catch limit of five a day. It further empowered the Director to declare a restricted area in said section of the river, and, subject to the approval of the Governor and Council, to make rules and regulations for the taking of trout therein. Acting on this authority, said section of the river was established as a restricted area for the purpose of breeding and developing trout, and the taking of fish therein was limited to capture by single rod and line held in the hand. On approval by the Governor and Council on May 12 these regulations became law.

There were some excellent fish taken from the Deerfield River this year.

LOCH LEVEN, BROWN AND RAINBOW TROUT

After waiting for several years it has become possible to take, this fall, a very limited number of eggs from our own brood stock of Loch Leven or

brown trout. This is the first step in perfecting our plan to have on hand a sufficient brood stock to take upwards of 200,000 eggs annually, that we may have a substantial number of these fish for distribution in the larger, warmer streams which are particularly suited to them.

We believe that there is a large field for such plantings, not only in some of the larger streams, but that eventually, by using 10-14 inch fish, we can establish the Loch Leven in some of the larger ponds.

The rainbow trout has shown its adaptability to certain of the larger streams, particularly in the western part of the State, to the extent that it now has a definite place on our stocking program.

CHINOOK SALMON

By a process of elimination the Chinook salmon fishing has been reduced to two or three ponds—particularly Peters Pond, Sandwich, Cliff Pond, Brewster, and, to some extent, Sheep Pond, Brewster. Over a period of years we systematically stocked a number of ponds with these fish, only to derive no results except as above. In the future a limited number of Chinook salmon will be reared for the stocking of these particular waters, but we do not believe it advisable to carry on any extensive breeding in the future.

WHITE PERCH

We have continued the policy of stocking selected groups of ponds, scattered over the State, with white perch. This species presents many interesting questions. It is a common experience to have reported to us that the white perch put into a given pond in a given year have shown no results. Two or three years may pass, when, unexpectedly, the fish will appear in sizeable numbers. Then the fishing may decline for a year or two, only to pick up again at a later date. Likewise they are an uncertain quantity in accepting the bait. In one locality a certain bait or lure will do the trick, and in another be regarded as ineffective. Where the conditions are favorable (and very often this can be determined only by actual stocking) it is our experience that, sooner or later, substantial returns will be realized from stocking with these fish.

PIKE PERCH

There is little to report on the pike perch fishing. It continues to center around the upper reaches of the Connecticut River. During the year quite a number of large fish (from 20 to 30 inches) have been taken in these waters. With the 12-inch size limit, the daily bag limit of 5, and the close season in the spawning period (February 1 to April 30) this species is now reasonably well protected.

PICKEREL

Reports from all over the State would indicate that this fish is not holding its own. The size of the fish taken is gradually falling off. We have frequently stated that the pickerel is the most popular fish in the State, and affords sport to the largest number of our fishermen. With reasonable protection it would supply a splendid volume of sport each year, and a large food supply. It is being fully demonstrated that the present protection is insufficient to enable it, by natural reproduction, to meet the intensive fishing to which it is subjected. We have already called attention to the necessity of further protection, and the conviction grows that this can only be given by establishing a rest period or a close season covering a substantial portion of the year.

By Chapter 27, Acts of 1926, the penalty for taking short pickerel is increased from one to ten dollars for each fish, the same as for other species. This is quite necessary when it is considered how largely the

pickerel fishery in this State depends on the protection of law for its maintenance.

SMELT

Whether or not smelt fishing will continue to flourish depends largely, if not entirely, on the extent to which the natural fresh-water spawning streams are kept free from pollution and the spawning beds protected during the spawning and hatching period. Every year we are confronted with the difficulty of compelling a certain element to keep away from these spawning grounds. This element would not only take the fish, but in the effort to catch them will wade up and down the streams, destroying the freshly deposited spawn. The smelt run at night, which complicates the giving of adequate protection.

Under existing law, smelt fishermen are not required to hold sporting licenses as is required of all fresh-water anglers. Since the smelt represent a splendid sporting opportunity, we believe that serious consideration should be given to an amendment to the license law to include smelt fishermen. We should annually expend a reasonable sum that our law-enforcement service may give this protection, and the fishing could be further improved by an annual re-distribution of a limited amount of the eggs deposited each year. There are coastal streams which could doubtless be developed into good smelt breeding grounds if funds were available to carry on an intensive stocking over a period of years.

BASS

The bass fishing continues to show gradual improvement. The general impression prevails that bass become dormant in winter, and that they are not taken while fishing through the ice, but the reports are common that sizeable bass are hooked in nearly every part of the State by ice fishermen. We do not believe that bass should be placed indiscriminately in our ponds, but if the ponds are selected with care and the annual stockings limited to a representative list, we believe that this fishery can be improved over its present volume. Undoubtedly it is very significant that the bass story differs from that of the pickerel—the close season on bass extending from December 1 to June 30, a period of seven months, as contrasted with the protected season of the pickerel of only two months.

HORNED POUT

There has been little change in the status of the horned pout. There is a growing sentiment in favor of the reduction of the present daily catch limit of 40 fish; also for a minimum length regulation. Some day, when the funds are available, we believe that these fish can be produced in large quantities by the pond cultural method that is now operated in a very limited way. That is to say, large selected brood stocks will be placed in natural or artificial ponds of good size, which will be drawn down annually and the small fish collected for distribution. By the selection of extra large fish for breeders, brought from various parts of the State, or from without, splendid results should follow extensive operations with these fish.

PONDS

Public Rights

As the provisions of Chapter 453, Acts of 1923 become more fully understood, there will be greater activity on the part of our citizens to the end that public rights of way may be laid out to an increasing number of our great ponds. They are the only bodies of water in which

free boating, fowling and fishing have been preserved to the people from the very beginning of our government.

As time goes on we believe that such a public right of way should be laid out to every great pond in the State. They should be sufficiently wide to permit vehicles to pass in each direction, with a walk for pedestrians, and with an additional strip of land to permit of a certain amount of reforestation to beautify the approaches. In addition, at the point where the public way touches the high water mark of the pond, a suitable additional area on each side of the approach should be set aside for public picnicking grounds, parking of vehicles, launching and use of boats, and a sufficient beach for bathing.

As the physical lay-out is developed for pond after pond, the public will be encouraged to permit special supervision over these ponds; that is to say, undoubtedly some will be set aside to be permanent wild life sanctuaries, with authority given this Division to make such special rules and regulations as it may deem advisable. The interests of the hunter, the fisherman, the bather and those who may desire to make other uses of these waters, will be adjusted on a live-and-let-live basis. It is fair to state that the public does not comprehend the far-reaching effect of the first colonial laws (which in the main have been perpetuated) in guaranteeing to our people forever the public right to these splendid bodies of water. Little or nothing has been done to develop them in a business-like manner for intensive use by the public. It is a fruitful field for future action, both by our citizens and by our governing commissions.

Great Ponds Stocked and Closed

The following-named ponds were stocked under Section 28, Chapter 130, General Laws, and closed to winter fishing by regulations expiring (with the exception noted) on November 1, 1929: Long Pond, Littleton (from Feb. 1, 1926 to Nov. 1, 1928); Dennis Pond, Yarmouth; Snipatuit Pond, Rochester; Long Pond, Yarmouth; Snow's Pond, Rochester; Winneconnet Pond, Norton; Quabbin Lake, Greenwich; Little Alum Pond, Brimfield; Mary's Pond, Rochester and Marion. The regulations applied to Congamond Lakes in Southwick in 1924 were rescinded when it was found that the process required by law had not been fully complied with, in that no public hearing had been held prior to the filing of the petition to this Division.

Privately-owned Ponds Stocked

By the provisions of Section 3, Chapter 131, General Laws relating to sporting licenses, the public is not required to purchase a license to fish in any inland waters which have not been stocked by this Division subsequent to Jan. 1, 1910. This limitation should never have gone into the original fishing license law when it became effective in 1919. It has been carried along in all subsequent changes in the license law, although for the last three years the Division, in its recommendations for legislation, has attempted to repeal it.

To make this provision workable, there is the added requirement that the Director shall furnish the city and town clerks (who issue the licenses) with "a list of inland waters stocked by him or his predecessors with fish since January first, nineteen hundred and ten, and annually, on or before January first a list of inland waters stocked by him with fish during the preceding year." The Division, in the years preceding 1910, may have expended substantial sums to stock various inland waters, which, owing to the large number of waters to be stocked, have not received stockings subsequent to that date. In all such waters the public may take, without a license, fish that the State has expended money and time to plant.

There is a large group of privately owned waters, usually reservoirs made by damming up streams, in which public fishing is permitted. In order to bring as many of these as is possible under the provisions of the license law, agreements have been entered into with a number of such owners, by the terms of which the public is permitted to fish in such waters for a period of ten years upon the same being stocked by the Division.

There are certain other private waters in which the owners are willing that the public may fish, but for one business reason or another do not desire to enter into the foregoing agreement covering a period of ten years. In some of these latter cases, in order to bring them under the above provision and that a license may be required of fishermen, some such waters have been stocked upon the written consent of the owner that fish may be put into these waters.

The retention of this clause relative to stockings subsequent to January 1, 1910 has been a constant source of annoyance, to say nothing of the loss of thousands of dollars in revenues from licenses. It has complicated the work of law enforcement, for it is necessary that the wardens prove, in all prosecutions for fishing without a license, that the waters in question have been stocked since January 1, 1910. It encourages certain individuals to try to "beat the game" by seeking out these waters, which has resulted in prosecutions, due to the fact that such individuals "took a chance" in waters which it turned out had been stocked.

We believe that a license should be required to fish all the inland waters, whether privately owned or not, except, perhaps, those private waters in which the owners artificially propagate their own fish supply.

Following is the list of privately owned ponds which were stocked on the stipulation of the riparian owners that the public may fish therein for a period of ten years.

Pond	Town	Fishing permitted to
Deborah Doane	Eastham	Sept. 21, 1935*
Russell	Chelmsford	July 30, 1935*
Bridges	Williamstown	Aug. 31, 1935*
Noyes	Westminster	June 30, 1935
Indian Lake	Worcester	June 18, 1935
Washingtons or Stewarts	Sterling	Dec. 14, 1935*
Hamilton or Holland Reservoir	Holland	June 3, 1936
Beaver	Bellingham	May 1, 1936
Heald Pond	Pepperell	May 1, 1936
Augutteback Pond	Oxford	Oct. 23, 1936
Lowe's Pond	Oxford	Oct. 23, 1936
Lower Mill Pond	Oxford	Oct. 23, 1936
Popes Pond	Oxford	Oct. 23, 1936
The Flats	Shrewsbury, Grafton	Sept. 17, 1928**
Hovey Pond	Grafton	Sept. 17, 1928**
Little Pond	Bolton	Nov. 27, 1936

Following is the list of privately owned ponds stocked with the consent of the owner, but without the stipulation permitting public fishing therein for a period of ten years.

Pond	Town
Whitman's Pond	East Weymouth
Long Pond	West Rutland

* Stocked in 1925 and omitted from the report of that year.

** Stock on two-year agreement.

The following privately owned ponds were stocked on agreement by the owners to permit the Division in future to take an equal amount of stock from the resulting increase: Pond on property of W. Irving Bullard, in Wayland, black bass; pond on property of Admiral Francis T. Bowles, in Barnstable, brook trout.

FISHWAYS

Several additional fishways were installed on alewife streams, the most important being those which opened up the entire Saugus River from the sea to the headwaters in Quannapowitt Lake, Wakefield. New fishways were also constructed on Herring River, Harwich, and Monument River, Bourne.

Following the usual practice all fishways were inspected at intervals during the spring run of fish, and the flow of water through them was regulated from early spring until the beginning of summer. On the newer and more important fishways this was done by men engaged specifically for this purpose—frequently employees of the mill companies—and who also recorded the species passing through the fishways day and night. Periodical inspections were also made by a representative of this Division.

Saugus River

Universal Tide Power Company.—At this dam, alewives surmounted without difficulty, and observations made below the Wallace Nutting dam (next above) where they were found in fairly large numbers, proved that the passage of the fish through the locks at this point had not been impeded.

Wallace Nutting Dam.—In January, 1925 the Division submitted to the owners of the site of this dam (known as the Scott Mill property) plans and specifications for the installation of a fishway over the dam. No action being taken by the owners of the mill property on these plans and specifications, a conference was held in November, 1925, with the owner on the grounds. At this time the owner was unwilling to install the fishway according to our plans and specifications, and it was finally agreed that the work should be done on the basis of changes and alterations in the original plans, and the owner's agent agreed that the work would be completed on or before the first of the following March. In view of the fact that at this conference certain changes were made in our plans and specifications, we made it plain to the owner of the dam proper that we would not agree to approve of these departures from our original plans; that we were willing he should go ahead with a modified scheme on his own responsibility, but we reserved the right to require any further changes if the modified arrangement was not effective in passing the fish over this obstruction. Upon inspection of the property around the first of March, 1926, it was found that nothing whatever had been done. After considerable controversy with the owner it was agreed that the Division's engineer should make certain changes in the present structure at a cost of fifty dollars, said amount to be paid by the owner. A rough set of boxes was installed early in May, and upon inspection, alewives were observed both outside the fishway and ascending it.

Prankers Pond Fishway.—As soon as arrangements for a fishway at the Wallace Nutting dam were completed, the matter of installing one on the property of the United States Worsted Company at Prankers Pond (the next obstruction above the Wallace Nutting dam) was taken up. The Company stated that they were even then starting the work, and before the first of March they had completed a very fine concrete fishway at a cost of some five thousand dollars. In order to have it ready for use this year, the work was done during the winter months when conditions were unfavorable, which added to the cost \$1500 more than would have been the case had they proceeded in good weather later in the year.

Our engineer reported it to be an exceptionally fine piece of work, true to plans and specifications, and the Company is deserving of the highest commendation for their co-operation.

Collins Fishway.—Late in September the owner of a farm in North Saugus, through which runs the Saugus River, requested our advice in installing a fishway on his property, where an old five-foot dam had been replaced to store river water for flowing a cranberry bog. This is the first instance where the owner of a dam has taken the initiative in complying with the State regulations concerning fishways. A conference was held with the owner, in which a survey of the premises was made, and the owner agreed to install a fishway at once along the lines indicated and in a manner which should be satisfactory. The work was completed early in November, and was found, on inspection, to be a good job. The actual working of the fishway cannot, however, be observed until the run in 1927.

The completion of this last fishway has opened up the entire Saugus River from the sea to the headwaters.

Ipswich River

Ipswich Mills Fishway.—Unfavorable weather and water conditions prevented satisfactory observations of the actual working of this fishway in 1925. In 1926 the first alewives were noticed in the river on May 3, and a good run from then on, covering the period May 12 to June 12, appeared in the fishway. From May 7 to 12 no fish were observed either in the fishway or the river, owing, undoubtedly, to the extremely heavy flow of water at this time. On May 14, there was a good run of fish in the river, but few seen in the fishway. A large number had congregated under the dam. On May 20, a very good run was reported, and these fish had been running for two days, experiencing no difficulty whatever in making they way up through the fishway. The observer estimated that there were ten barrels of fish in the fishway on May 21.

It was noticed that the very cold spring apparently affected the run, for there would be a very good run for a few days, and then it would drop off almost entirely. On May 22, only three alewives were seen in the fishway, but a larger number were observed about a mile down the river. On May 27, a large school of alewives was observed in the river. On June 1 to 9, not one was seen. June 10 to 12, a number were seen below the dam on the opposite side of the fishway, and after June 12, none were seen, so the run apparently ended previous to this date. The observer reported that the biggest run of fish took place on the ebb tide, and it was his opinion that it is not so much the dye stuff from the mill that prevented the fish from ascending the stream in greater numbers, as the waste gas and motor oils emptied into the river from garages.

Norwood Mills Fishway.—Though careful observations were made at this, as at all fishways, not an alewife was seen in the fishway or in this part of the river, and it is the belief of the observer at the Ipswich Mills fishway (next below) that the fish, after passing through the Ipswich Mills fishway, follow the main channel to Miles River, where it is impossible for them to surmount the dam. Large schools of fish were seen breaking water in this vicinity, and were identified as alewives. The matter of the installation of a fishway at that site will be taken up with the owner before the next run of fish.

Willowdale Dam.—The new cement fishway constructed on the Willowdale dam in November, 1925, was in operation for the first time. It proved to be a good type, and the fish surmounted it without difficulty. Between April 22 and June 30 59 shiners and dace, 34 yellow perch, 12 trout, and 701 miscellaneous fish (eels and flat fish) but no alewives, passed through the fishway.

Parker River

No fishways were installed on the Parker River. On May 21, an exceptionally heavy run of alewives was reported in the Parker River at Byfield, with great congestion below the first obstruction on the stream. A fishway at this point would remedy the situation and establish a fishery without further effort on our part, for the alewives here are seeking a way to continue on up to former natural spawning grounds in the three great ponds above.

Merrimack River

Lawrence Fishway.—Extremely high water conditions through the early part of April prevented connecting the iron flume of the fishway with the dam proper, and not until April 22 was the fishway in actual operation. This is the fifth year that observations have been made. The records show a decided increase in the number of fish using the fishway, particularly alewives.

Lowell Fishway.—This year completed a five-year period of special observations, and a steady increase is shown in the number of fish using the fishway—1,478 alewives in 1926 against 757 in 1922. Alewives were observed here five days before their first appearance at Lawrence, indicating that apparently large numbers passed through the Lawrence fishway either at night or at some time when the observer was not on duty. Between April 24 and June 30, the following were seen at the fishway. 1,478 alewives, 242 shiners and dace. On June 8, observations between 1 and 1.45 A. M. revealed an extremely large school of true alewives in the fishway, some measuring as long as 15 inches.

Paskamansett River

Cummings Fishway.—Observations were made in the fishway on the Cummings dam, Russells Mills, South Dartmouth, and the unfavorable conditions previously reported were found to still exist. Early in May, the Division's engineer, who designed this fishway, made the first examination of it since installation. He found it wholly unlike that designed by him in 1919, also that it had been installed in a different location than that which he had advised. The side walls were not carried up to the height called for in the plans, so that, during the high-water period, the fishway is entirely submerged. The fishway will not function properly except when the pond above is drawn off, and the same conditions restored as with the brook flowing naturally.

Much of the flow from the pond came through another branch of the river, being fed by a 12-inch pipe which has no valve, and which if constantly left open, would necessitate the screening off of the west branch of the river to attract alewives into the east branch, on which the fishway is located.

Alewives were first seen in the river about May 3 in Turners Pond, above Smith's Mills. As the five-year period has now passed since the installation of this fishway, negotiations will soon be opened with the owner for the correction of the present conditions.

Taunton River System

The entire Taunton River system was thoroughly checked up, and any unfavorable conditions noted were corrected. Manufacturers operating plants located on the dams of this river system co-operated with the Division by making changes suggested, and by permitting their employees to make daily observations of fish using the fishways, as well as to regulate the flow of water through the ways.

East Taunton Fishway, Raynham.—The fishway on the dam of the Connecticut Mills was in operation from April 12 until well into the sum-

mer. The first alewives were seen below the dam on April 11. An extremely heavy run of fish was reported during the last week in April and the first two weeks in May. In fact, many more alewives ascended this stream during this year than last, proving, it is believed, that the planting of adult stock is bearing fruit.

Early in May, the water in the river was extremely low, scarcely enough to operate this fishway, with a big run of fish attempting to ascend. There was water enough in the raceway above the top box, so that by making a large opening in the top box, enough water was permitted to escape through the fishway to allow the fish to surmount easily. This condition can be overcome another year by lowering the top box base to the bed of the river or at least to the base of the fishway. This matter will be called to the attention of the mill owners before the next run of fish, and the necessary repairs and changes made.

Jenkins Leatherboard Company Fishway.—Most gratifying results were reported in this fishway (on Town River, West Bridgewater). On April 30 the alewives made their first appearance of the season at this mill in Prattown, a school numbering probably several thousand. The water wheels in the mill were shut down from 11 P. M. to 7 A. M., thereby directing more water through the fishway, and if the fish used the way at all, it was at this time. In the previous year only a few hundred were seen, probably the results of the first planting of adult fish. The large number observed this year pointed conclusively to the success of the alewife planting during the past five years.

At this location the alewives preferred to go up stream against the strongest current, which was from the flume where the water wheels are located, but they could get no farther, which necessitated turning them back down stream and screening off the flume, compelling them to make the trip up through the fishway. After this was done, careful watch was kept at the fishways above to check the number running. (For details see other fishways located on this river system.)

On May 24—131 adult spawning alewives from the East Taunton fishway were planted just above the Jenkins Leatherboard Company fishway, to continue the restoration of this fishery, and these were seen ascending the next fishway above. This planting was done to ascertain which way the fish would travel, that is, the Satucket branch to East Bridgewater, or the Town River to West Bridgewater. They took Town River to West Bridgewater, at the Jenkins Leatherboard Company at West Bridgewater and Prattown, which is the last fishway on the Taunton Great River, before East Taunton is reached going down stream. Alewives were seen several days ascending the fishway. Thanks and much credit are due Superintendent Fuller of the Jenkins Leatherboard Company, for his assistance, interest and co-operation in getting these fish over the dam of his company.

On May 11, large numbers of alewives were observed in this fishway. On May 21 large numbers of alewives were observed ascending the fishway. On May 24 and 25, several hundred fish were observed at various times in the pond above the dam, and evidently used the fishway to descend, as they eventually disappeared and no dead fish were seen below the wheels. Between May 1 and 21, 1,815 alewives were recorded as passing through this fishway. On June 22 the fishway was closed, no fish having been seen for several days.

Stanley Works Fishway.—In this fishway (on the Town River, West Bridgewater) large numbers of alewives were observed below this dam, proving the efficacy of planting adult spawning alewives in the headwaters. 201 alewives were planted directly above the Stanley Works fishway on May 11, collected below the dam at the East Taunton fishway. This planting gave us adult alewives between the Stanley Works fishway and the Easton Investment Company fishway at West Bridgewater, in addition to those planted between the Jenkins Leatherboard Company

fishway, Stanley Works fishway, and the Carver Cotton Gin Fishway, on the other branch toward Monponsett Lake.

There is still need of a screen across the stream from the lower end of the fishway to the opposite bank, and the officials of the Company have indicated their willingness to install one. From April 26 to June 4 there were 52 alewives, 4 shiners and dace, and an unrecorded number of miscellaneous fish (as well as numerous schools of alewives uncounted) observed in the fishway.

Easton Investment Company Fishway.—Conditions all through the spring were ideal at this fishway for any species of fish ascending it. A nearby resident reported, from April 12 to 16, schools of hundreds of large yellow perch at a time, using the way. In addition, pickerel were noted.

Careful watch was kept for alewives, both those that had been planted above the Stanley Works fishway and the regular run, but only three were seen. Probably none ascended the Town River to this point at the Eastern Investment Company fishway, and those which were planted above the Stanley Iron Works fishway, in addition to those that came up from the Jenkins Leatherboard Company fishway and through the Stanley Works fishway, remained and spawned in the pond on that enlarged, broadened-out section of the river above the Stanley Works mills. The bridgework, which has been under way the entire spring and summer, between the Stanley Works fishway and the Eastern Investment Company fishway, probably interfered with their progress up the river to this point, and undoubtedly had a tendency to scare them back.

Hanson Cedar Company Fishway.—This fishway (on Stump River, Halifax) functions properly only when there is sufficient water in the river. Changes will be required of the owner after a lapse of the five-year period from installation.

Carver Cotton Gin Company Fishway.—This fishway, located on Sackett River, East Bridgewater, has never functioned satisfactorily since its installation over five years ago. The owners have signified their willingness to receive suggestions for changes. On April 20 the fishway was inspected to determine what changes could be made to make it work more adequately. It was decided, however, (inasmuch as the alewife has not yet appeared in this branch of the river) to defer asking the owners to incur the expense of alterations until alewives are actually seen outside the fishway and unable to ascend. Though careful watch was kept, both by employees of the company and by representatives of the Division, no alewives were seen this year. About the middle of April schools of yellow perch were observed using the fishway.

Electric Light Power Plant Fishway, and Star Mills Fishway.—These two fishways, located on the Nemasket River, Middleboro, were inspected periodically during the spring, and large numbers of fish were observed surmounting them without difficulty. The fishing right was not sold by the town this year, and all fish passing upstream were permitted to reach the spawning beds.

Agawam River—East Wareham

This fishway was found to function properly, and large numbers of alewives ascended to the spawning beds. Mr. George M. Besse of East Wareham operated the fishery again this year, having purchased the right from the town of Middleboro.

Monument River

Bournedale Fishway.—In the late fall of 1925, the repairs and alterations on the Boston, Cape Cod and New York Canal Company's fishway were completed. The Division's engineer, who designed the plans and specifications for these changes and repairs, inspected the job early in

January and reported the work to be true to plans and specifications, and that, in spite of the difficulties of combatting swift tides and wash from passing boats, the owners had turned out an excellent piece of work.

Early in the spring, Mr. George M. Besse of East Wareham purchased the fishing rights on this stream for the next five years. For a year or two previously, Mr. Besse had the fishing privilege, and during that time he had constructed a wooden fishway alongside of the cement construction, which, he claimed, gave much better results than the concrete construction in getting the fish upstream. Mr. Besse applied to this division for the right to construct a somewhat similar permanent fishway alongside of the large original concrete construction, that is, he wished to relay some of the stone which had been piled against the side of the fishway for about one-half its distance, running from the top down, in order to make a fishway about three feet wide. After these stones had been put into position, he wished to float concrete in among them, in order to make a solid piece of construction.

From this point down into the canal, it was planned to put in a temporary wooden fishway, three feet wide. In order to do this, it was necessary to take out some of the rock along this side of the canal, which had been banked in. Mr. Besse stated he was willing to relay the rocks alongside of his fishway in such a manner as to give the original structure as much support and protection as it then received from this rock in position. He was also willing to dump 500 tons of rock along the shore in between his fishway and the canal, as additional protection to the rocks which the Canal Company had put there, and was also willing, of course, to assume all financial responsibility for installing this fishway.

It was the opinion of Mr. Besse, after carefully inspecting the original fishway which had been repaired, that during a certain stage of the tides, alewives are unable to enter the fishway for the reason that the surface of the water would be too far below the down-stream entrance to the fishway, thus resulting in barring the fish from ascending it for a substantial period of each day. Mr. Besse finally obtained permission from the Canal Company to proceed with the construction of his own type of fishway, which was in operation on April 15.

From April 15 to May 17, 300 barrels of alewives had been taken at the catching place above the fishway, and on May 17 it was estimated that there were 2,000 barrels of alewives then in the canal, and these Mr. Besse had planned to allow to run to the spawning beds. Observations made of both fishways on the canal showed that 102 alewives passed by a given point through the Besse fishway in one minute, as compared with 20 alewives which passed by a given point in one minute through the original concrete construction.

Red Brook, Cataumet

The usual observations were made, and nothing unusual was noted. Conditions were found to be the same as in the year previous. The fishway is still in need of repairs, and it is expected that the existing conditions will be corrected during the coming year.

Cole's River, Swansea

Montaup Electric Company Fishway.—Observations were made at various times in the new "Keil" type of fishway constructed on the property of the Montaup Electric Company. While there were a considerable number of alewives in the river, none appeared able to surmount the fishway, due to the heavy flow of water and the lack of facilities in the construction of the fishway for regulating the flow of water. The company has been requested to make changes in the structure during the coming year.

Herring River—Harwich

United Cape Cod Cranberry Company Fishway.—Early in March application was made to this Division by the United Cape Cod Cranberry Company for advice concerning the installation of a fishway in the flume, constructed by them on newly-acquired property, by which they control the water for flowing their cranberry bogs above. The location of this flume is at a point on the river used in past years as a catching place by the purchaser of the herring rights. Desiring not to conflict in any way with the herring interests of the town, the company wished to install a herring run which would be satisfactory to this Division. Surveys were made, plans and specifications furnished to the company on March 23, and by early June a fishway had been completed, true to plans and specifications, which appears to be adequate to enable the fish to surmount the dam without difficulty.

Robbins Pond—East Bridgewater

United Cape Cod Cranberry Company Fishway.—On receiving notice from the United Cape Cod Cranberry Company of their intention to construct a fishway at the outlet to Robbins Pond, East Bridgewater, a conference was held and plans and specifications submitted the middle of September. The fishway is to be installed at the locality decided on at the conference, namely, that part of the pond near where the channel previously flowed. This will give the alewives and other anadromous fish clear passage to and from this pond, and the fishway will undoubtedly be completed next spring.

POLLUTION

A few complaints of pollution in inland waters were reported to this Division, and were investigated. No serious problems arose, however, and in the cases reported the offenders indicated their willingness to correct the difficulties.

PROPAGATION OF FISH AND GAME

FISH HATCHERIES AND GAME FARMS

General

Certain items of new construction and replacement were advanced at the fish hatcheries and game farms during the year. These changes were financed partly by further expenditures of contributions from the local fish and game clubs and the county leagues (see Acknowledgments), and partly from our very limited appropriation for new construction work.

The year's experiments with the brail went far to confirm our original belief that this device could be used to great advantage in carrying six to eight-weeks' old pheasants to maturity in open pens, by confining one wing.

Year after year the cost of fish food has increased. Experience has shown pork liver to be the best all-round food, and this, today, costs six cents a pound. The feed bills at the hatcheries and game farms form a very large item in the annual cost of operation. We are constantly studying methods of reducing these expenses, while at the same time giving the stock a suitable ration. We have begun experiments in feeding horse meat to the fish from the 4-5 inch fingerling size up, as a substitute for the higher-priced liver. This year we are carrying over, for rearing to larger size, a greater stock than ever before in our history, of selected fingerlings, and they consume large quantities of food.

A considerable amount of reforestation was done at all the stations, with stock supplied from the Division of Forestry, mostly poplar, spruce, fir and arbor vitæ.

Amherst Rearing Station

In addition to construction done with funds contributed by the fish and game clubs, appearing elsewhere in this report, further construction was done out of the general appropriation, as follows: During the early part of the winter, part of the land adjoining the hatchery grounds now under lease were brushed out, in order to have them ready for surveying. During the summer the surveying was done and the areas suitable for rearing work were laid out into pools and ponds. One section was cleared of trees and stumps preparatory for the construction of large pools. The concrete foundation for an addition 12 x 20 ft. to the superintendent's cottage was put in and the materials were gotten on to the ground to cover most of the outside construction of the addition. There were 3,750 trees set out.

Brook Trout.—The year opened with 21,800 fingerling brook trout on hand, (a recount added 3,800 to the previous inventory). 500 were lost, and 21,300 were distributed the following spring as yearlings.

For the work of the season 134,200 fry were received from the Montague Rearing Station, 185,102 from the Palmer Fish Hatchery, and 200,000 from the East Sandwich Hatchery. These resulted in 284,102 fingerlings, to which were added, late in September, 15,000 (3-4 in.) from the Montague Rearing Station and 3,000 (4-5 in.) from the Sutton Fish Hatchery. There were losses of 58,400, distribution of 220,000, and 23,702 remain on hand to be carried through the winter for spring distribution.

Loch Leven and Brown Trout.—After conducting experimental work with the brown and Loch Leven trout at the various stations it was decided to concentrate the work at the Amherst Rearing Station, and during the summer and fall all of the stock was assembled here.

(1) *Brown Trout.*—The year opened with 7,760 brown trout fingerlings on hand. 5,050 were distributed as yearlings, 2,110 were lost, and 600 remain on hand November 30.

404 adult brown trout were received from the Palmer Fish Hatchery, of which 44 were lost, 12 sent to fairs and thence distributed, and 348 remain on hand November 30.

(2) *Loch Leven Trout.*—The year opened with 4,000 Loch Leven trout fingerlings on hand, which were later transferred to yearlings. To these were added 4,185 yearlings from the Palmer Fish Hatchery, making a total of 8,185. 604 were lost, 6,400 were distributed, and 1,181 remain on hand November 30.

In November 9,200 fingerlings were received from the Palmer Fish Hatchery, which are also on hand at the close of the year. There are now assembled at this station a fine lot of brown and Loch Leven trout in the process of development, from which it is planned eventually to collect from 200,000 to 500,000 eggs.

Montague Rearing Station

Before the active work of the year began the hatchery building and equipment was painted and put in condition to receive stock. In addition to the work done with funds contributed by the fish and game clubs, appearing elsewhere in this report, further work was done out of the general appropriation, consisting of surveying, early in the summer, a portion of the grounds at the lower part of the hatchery. This entire area was later cleared of brush and trees. On this large area the large pools previously referred to were constructed. A good start

was made in planting trees, which will be continued along with the development of the station. 1,215 were set out this year.

Brook Trout.—15,000 fingerlings were on hand when the year opened. Beginning in April and continuing throughout the year as the work permitted, 13,599 were distributed as yearlings. There were losses of 601, and the remaining 800 are on hand November 30, to be carried through the winter.

No eggs were collected this year, as the brood stock was distributed before the spawning season in the near-by rivers, so that all the ponds might be cleaned and the banks rebuilt. 575,000 eggs were purchased, and 225,000 received from the Sandwich Hatchery. One lot of the commercial eggs was in poor condition and several thousand bad eggs resulted. The total hatch of fry was 700,350, which came along very well except the fish from the poor shipment. By the last of March all the fry were in the pools outside. 134,200 fry were shipped to the Amherst Rearing Station, and 197,929 were lost. The losses were confined to the one poor shipment, in which losses were experienced until the fish had been feeding in the outside ponds for five weeks. After that they did as well as the others. The balance of 368,221 fry were transferred to fingerlings, to which were added 17,104 ($1\frac{1}{4}$ in.) from the Palmer Hatchery, making a total of 385,325. From this number 15,000 (3-4 in.) were sent to the Amherst Rearing Station, 265,825 distributed, and 4,500 were lost, leaving 100,000 on hand November 30 to be carried through the winter for spring distribution as yearlings.

The distribution work was greatly facilitated by the courtesy of the Forestry Division in loaning their large Mack truck for the shipments into Berkshire County.

Rainbow Trout.—From the U. S. Bureau of Fisheries Station at White Sulphur Springs, West Virginia, 25,000 rainbow trout eggs were received in exchange for brook trout eggs. Of these 18,606 hatched into strong, healthy fry. After having fed for four weeks they started to drop off, with no apparent reason except possibly the change of conditions. The losses were estimated at 8,560. The remainder were transferred to ponds up the back stream, where they finally came along very well the rest of the summer, resulting in 10,046 fingerlings. 150 were lost, 250 exhibited at fairs and thence distributed, and 9,646 remain on hand to be carried through the winter for further rearing.

Palmer Fish Hatchery

In addition to the work done with funds contributed by the fish and game clubs, described elsewhere in this report, further construction work was done out of the State appropriation, as follows: A new iron screen was installed at the outlet of the dam in front of the hatchery building, and a new platform laid in front of the hatchery building to replace the old one. The bass ponds were cleared of vegetation, the mud thoroughly cleaned out of Pond No. 1, and the bottom of the latter nearly covered with sand to fill up the low spots and make the bottom more level. 500 trees were set out.

Brook Trout.—The 300 fingerlings on hand December 1 were lost. 575,000 brook trout eggs were purchased, of which 350 were given away for study and experimental purposes, and 36,801 lost. Of the 537,849 fry hatched, 185,102 were sent to the Amherst Rearing Station, 137,200 to the Sutton Fish Hatchery, and 43,967 lost. The resulting 171,580 fingerlings were disposed of as follows: 25,000 (2 in.) to the Worcester County Fish and Game Association rearing station; 17,104 ($1\frac{1}{4}$ in.) to the Montague Rearing Station; 19,000 ($1\frac{1}{4}$ in.) to the Sutton Fish Hatchery; 53,895 lost; 26,930 distributed; and 29,651 remain on hand November 30 to be carried through the winter for spring distribution as yearlings.

139 adult trout salvaged from the supply pond were distributed.

Brown Trout.—At the opening of the year there were 15,000 brown trout fingerlings on hand, 13,250 of which were lost and 1,750 distributed as yearlings.

There were also on hand 600 yearlings, which were transferred to adults.

There were also on hand 5,628 adults, which, plus the 600 transferred from yearlings above, made 6,228 adults handled during the year. Of these, 404 were sent to the Amherst Rearing Station, 1 to the Eastern States Exposition and thence distributed, and 5,823 lost.

Loch Leven Trout.—The year opened with 7,700 fingerlings on hand, of which 26 were lost and the balance of 7,674 transferred to yearlings. 3,489 were lost, and 4,185 were shipped to the Amherst Rearing Station.

100,000 Loch Leven trout eggs were received from the U. S. Bureau of Fisheries Station at Bozeman, Mont. in exchange for brook trout eggs. These produced 87,966 fry, 27,990 of which were lost, and the remaining 59,976 transferred to fingerlings. Of these, 9,200 were sent to the Amherst Rearing Station, 41,751 lost, and 9,025 distributed.

Horned Pout.—From the supply of horned pout fingerlings purchased from the Carter Pond Company and held over from last year, there were distributed 20,000 fingerlings and 6,150 yearlings. From the hatchery stock there were distributed 5,175 fingerlings, 175 yearlings and 17 adults.

Small-mouth Black Bass.—There was a very successful hatch of small-mouth bass. As an experiment, 14,000 fry were shipped to the Stockwell Ponds, to be reared, if possible, into fingerlings. 137,000 fry, 31,550 fingerlings, 650 yearlings and 8 adults were distributed.

Blue Gills.—From the supply pond at the hatchery, 4,590 blue gill yearlings (2-4 in.) were collected and distributed.

Pickereel.—When the supply pond was drawn down there were collected and distributed 750 fingerlings and 308 adult pickerel.

Sandwich Fish Hatchery

In addition to the work done with funds contributed by the fish and game clubs, described elsewhere in this report, further construction was done out of the State appropriation, as follows. Two new ponds (15 x 100 ft.) were built, and four of the ponds constructed last year were completed by taking the dirt from the new ponds and building up the sides. Four wells were driven to give a larger supply of water to the new pools. The roofs of the hatchery building and the meat house were repaired and considerable additional grading done around the new developments. 24 feet of 24" tile was placed under the road at the Sandwich hatchery to carry off the surplus water. Six hundred trees were set out.

Brook Trout.—At the beginning of the year there were 55,850 fingerlings on hand, 11,668 of which were lost and 44,182 transferred later to yearlings. Of this number 188 were lost, 40,365 distributed, and 3,629 remain on hand November 30.

There were also on hand, the beginning of the year, 7,178 adults, of which 3,157 were lost, 650 distributed, and 3,371 are on hand November 30.

1,176,000 brook trout eggs were collected from the station stock and 50,000 purchased. Of these 250,000 were transferred to the East Sandwich Hatchery; 125,000 sent to the U. S. Bureau of Fisheries (in exchange for Loch Leven and rainbow trout eggs sent to the Palmer and Montague Fish Hatcheries), 225,000 to the Montague Rearing Station, and 50,000 to the California Fish and Game Commission in exchange for Chinook salmon eggs furnished to the East Sandwich Hatchery.

Of the 512,000 fry hatched, 55,930 were lost and 456,070 transferred to fingerlings. From the fingerling stock 182,400 ($1\frac{1}{4}$ to $1\frac{1}{2}$ in.) were

sent to the Sutton Hatchery; 25,000 ($1\frac{1}{2}$ in.) to the Canton Fish and Game Association rearing station; 25,000 ($1\frac{1}{4}$ to $1\frac{1}{2}$ in.) to the Peabody Fish and Game Association rearing station; 50,400 ($1\frac{1}{2}$ to 2 in.) to the Worcester County Fish and Game Association rearing station; 11,500 (2 to $2\frac{1}{2}$ in.) to the Peabody Fish and Game Association rearing station; and 60,700 distributed. 1,182 were lost, and 99,888 remain on hand November 30 to be carried through the winter for spring distribution as yearlings.

Brown and Loch Leven Trout.—472 brown trout fingerlings on hand December 1 were added to the 3,359 Loch Leven fingerlings, making a total of 3,831 brown and Loch Leven trout on hand. 2,246 were lost and the balance of 1,585 transferred to yearlings. Of these 765 were lost and 820 distributed.

East Sandwich Fish Hatchery

In addition to the work done with funds contributed by the fish and game clubs, described elsewhere, further construction was done out of the State appropriation, as follows: One pond was dug out and a new dam built across the lower end, making a large pond 45 x 60 ft. Two additional ponds were enlarged to 25 x 50 ft. by tearing out the wooden partitions and digging back into the banks in order to have as much natural dirt sides to these ponds as the lay of the grounds would permit. Two of the ells on the Nye house were torn down, the openings shingled over, and the cellar under one filled in and the ground graded.

Brook Trout.—Of the 30,000 fingerlings on hand the first of the year 5,886 were lost and the balance of 24,114 transferred to yearlings. 19,897 were distributed, 621 lost, and 3,596 remain on hand November 30.

There were also on hand, at the beginning of the year, 650 adults, 300 of which were distributed and 350 lost.

The egg stock consisted of 100,000 collected from the brood stock and 250,000 from the Sandwich Hatchery. 100,000 were lost, and 250,000 fry hatched. 200,000 fry were sent to the Amherst Rearing Station, 3,680 were lost, and 46,320 transferred to fingerlings. 12,500 fingerlings were distributed, 351 lost, and 33,469 remain on hand to be carried through the winter for spring distribution as yearlings.

Chinook Salmon.—50,000 Chinook salmon eggs were received from the California Fish and Game Commission (in exchange for brook trout eggs), 13,050 of which were lost and 36,950 hatched. 2,500 of the fry were lost, and the remaining 34,450 transferred to fingerlings, which were disposed of as follows: 2,050 lost, 14,400 sent to the Dighton Fish and Game Club rearing station, and 18,000 distributed.

Sutton Fish Hatchery

Repairs and replacement were more extended than usual, and carried on more or less actively during the whole year, with particular attention to the buildings, and to pools that could be used in carrying yearlings.

In addition to the work done with funds contributed by the fish and game clubs, described elsewhere in this report, further construction was done out of the State appropriation, consisting of the following. The decayed lower walls of the meat house were replaced with concrete, floor drainage improved and the walls above the new concrete cleaned and repainted.

In the hatching building decayed sections of roof and finish were replaced and the roof recovered with slate surface paper. Glass was reset and the windows and the outside of the building painted.

Rearing boxes made for outside use were refitted and set inside the building for the handling of pond fish in course of distribution.

The piazza of the superintendent's house was rebuilt, copper wire screens installed, window sash puttied and painted, and minor repairs made.

The old barn was repainted on the three most exposed sides, and the part used as the truck garage partly sheathed inside with sheet rock. In addition, a concrete wall was built inside below the sheet rock for fire protection.

The new barn, being no longer used for keeping a horse, was made over for general storage and special purposes.

Another lot of rearing boxes was set out-doors below the dam at the rear of the ice house, and fitted for carrying and sorting yearlings during the distribution period; also to handle pond fish.

The shipping stand was rebuilt with a heavy timbered frame, and concrete main supports. A holding pool was also constructed underneath for the handling of fish for distribution.

The stock of trees for planting about the ponds was increased by 3,500 from the Forestry Division and planted in beds at the hatchery for further growth while the land for planting is being cleared. With the work of caring for these trees, a selection of shrubs and trees for bird-feeding was planted, and transplanted in beds from previous plantings. The stock now numbers several thousand, and will be fully doubled by the plantings of this year, which included 2 barrels of black walnuts donated for this work. Earlier plantings of 12 to 15 years ago are showing interesting results in natural seedings, extended through the fields and woods for some distance, where the birds have carried the seed, and this seeding has been so extensive that a large number could be taken up for replanting in beds for adding to the stock.

Brook Trout.—Of the 36,000 fingerlings on hand at the opening of the year, 1,000 were distributed as fingerlings and the remainder placed in pools for rearing to yearlings. 19,000 were lost, 15,800 were distributed as yearlings from March to November, and 200 remain on hand November 30.

Stock for the year's operations was received as follows: from the Palmer Fish Hatchery, 137,200 fry of which 87,000 were lost. With the remaining 50,200 the pools were restocked. To these were added 182,400 fingerlings ($1\frac{1}{4}$ to $1\frac{1}{2}$ in.) from the Sandwich Hatchery, and 19,000 ($1\frac{1}{4}$ in.) from the Palmer Fish Hatchery. 3,000 (4-5 in.) were shipped to the Amherst Rearing Station. The conditions for growing were good, and they made the usual growth on a much reduced ration, with more infrequent feedings. There was an unusual low stage of water through the greater part of the season, owing to the extreme drouth. This was the third in annual succession, with a progressive lowering of the ground water each year. It hampered the work most by the necessity of keeping the reserved fingerlings crowded during the season when the pond fish were brought in and kept in large numbers, and this, to some extent, affected the growth during the fall months. Of the fingerlings 71,300 were lost, 147,300 distributed, and 30,000 remain on hand to be carried through the winter for spring distribution as yearlings.

Brown Trout.—At the opening of the year there were 1,200 fingerling brown trout on hand, of which 900 were lost and 300 distributed as yearlings.

Loch Leven Trout.—The 800 on hand at the opening of the year were lost.

Pheasants.—Early in September 300 young pheasants were received from the Marshfield Bird Farm and carried in the refitted bird pens through winter for spring liberation.

FIELD PROPAGATION

Pond Cultural Work

The work of taking pond fish from the Stockwell Ponds, preparatory to distribution, was finished just at the close of the previous year. These were distributed during the winter and spring.

The dams were further strengthened and raised. As a result, all the ponds were brought to a higher level, practically high-water mark, in the spring, and a higher average level maintained through the whole season, including the long and severe drouth.

Tree planting was continued with spruce, and red, white and Scotch pines supplied by the Forestry Division, chiefly around No. 3 pond and in the abandoned cemetery.

Lowering of the water in the ponds for fall work started early in October. Distribution began just before the middle of the month, chiefly with blue gill fingerlings, as it was evident that these were in the ponds in large numbers, and could be taken without mixture with the other fish by a slow run of water, without drawing the ponds low. In this way the blue gill fingerlings were taken from Ponds No. 1 and No. 2 in the lower trap, and from Pond No. 3 in a trap built below that pond. This method has the advantage of avoiding the injuries and losses among these small fish incident to their struggles with the larger fish, and saves the tedious work of sorting.

This work was practically completed when a series of rains, five in November, and each followed by a considerable flow of water, suspended the work with the other fish. At the close of the fiscal year the young stock had been entirely removed from Pond No. 1 and a part of the fish taken from No. 3. No. 2 had been practically drawn off to run the fish to the lower trap, but none of the larger fish had been taken. At this point the operations showed an excellent breeding year for blue gills. The pickerel, horned pout and perch fingerlings (this year's production) did not show up in numbers to indicate the usual increase, and the size was below average; but yearling pickerel, blue gills and horned pout were being taken in large numbers from the stock left where the work was incomplete the previous season.

Distributions from the pond for the period of this report (Dec. 1, 1925 to Nov. 30, 1926) were: 134,300 fingerling and 785 yearling blue gills; 79,400 fingerling and 12,065 adult horned pout; 19,050 yearling yellow perch; 2,700 fingerling and 350 adult (10-14 in.) pickerel.

During the year 14,000 black bass fry from the Palmer Fish Hatchery were planted in the lower pond.

Ayer Game Farm

Repairs (replacing decayed sills and floor joists and relaying floor in one portion of house) were made to the house, including the rearrangement of partition walls, painting, and rebuilding of a concrete cellar bulkhead and the laying of a concrete porch. Certain of the rooms were repainted and papered.

A number of young fruit trees, grapevines and berry plants were purchased and set; two plats of ground that had been in hoed crops the year before were seeded to a clover mixture, with oats for a nurse crop. The ground occupied by the pens during the preceding summer was broken up and corn, kale, mangles, etc. planted. In spite of an extremely dry summer and a killing frost on June 17, good crops were raised and harvested; but, due to the dry season, the hay crop was very light. In September, 600 young evergreens from the Division of Forestry were set out in waste areas desirable for reforestation.

The station, closed since the preceding July, was re-opened December 1. Pheasants were received for egg-producing stock, 219 from the Marshfield Game Farm and 188 from the East Sandwich Game Farm (being the 201, minus 13 lost in transit, recorded in last year's report). Only routine work and feeding and caring for the birds was carried on up to March 1, when the busy season began. Pens were prepared for breeders, brush cut and bound into faggots for nesting shelters, and sanitary watering devices made. At the beginning of the laying season the stock, reduced by losses of 13 and distribution of 2, numbered 392,

from which 14,375 eggs were collected. 560 proved infertile, 560 were sent to other Commissions, and 13,255 distributed to clubs and individuals, the birds resulting from these eggs to be distributed locally.

Of the 392 brood stock on hand at the beginning of the laying season 25 were lost, 3 sent away for scientific examination, 361 liberated, and 3 remain on hand November 30.

The station was closed July 31, but, owing to congested conditions at the other stations, the quota of 169 young pheasants from the Marshfield Bird Farm for the 1927 brood stock was taken in August (rather than later in the season) and carried with no expense except for feed. To meet an emergency, 25 of these were shipped to the New Hampshire Commission (birds being returned later in exchange).

The station was re-opened October 19 to winter the 1927 brood stock, consisting of the 3 remaining from the old brood stock, the 144 remaining of the Marshfield quota, 67 from the East Sandwich Bird Farm, 133 from Wilbraham, and 85 from the New Hampshire Commission (25 of which were in return for the shipment previously mentioned, and 60 being reimbursement for birds from the East Sandwich Game Farm). To this stock 13 more were added (10 from an unclaimed allotment of eggs, 2 from wild eggs, 1 raised by a crippled hen from the old brood stock), bringing the total stock on hand to 445. Losses of 17 and 2 escapes left 426 on hand November 30. 400 will be retained as egg-stock and 26 held for spring liberation.

East Sandwich Bird Farm

In addition to the work done with funds contributed by the clubs, described elsewhere in this report, further construction was done out of the State appropriation as follows. The main construction job of the year was the building of a new brooder house, with a room adjoining to house a heating plant. The work started in the spring, was discontinued during the period of hatching and rearing, and resumed in the fall with the expectation of completing it during the winter months. The building is 15 x 72 ft. (60 ft. for brooding purposes and a 12-foot section to house the furnace below the floor, with feed and storage space above). It will accommodate about 2,000 day-old pheasants for the first two weeks of their lives. There will be the usual covered yards in front of the house, 40 ft. long, and wide enough to correspond with each section of hover inside the house. In line with further additions for brailing yards, another open yard for this purpose was completed late in the fall. It is one-half acre in extent, circular in form, and occupies the upland space north of the winter pheasant houses and the workshop on one side, and the marshes on the opposite side, and well supplied with trees, shrubs, grass and plowed ground.

The year opened with 595 adult pheasants on hand, reduced by losses of 33 and distribution of 30, to 532 at the beginning of the breeding season. 17,062 eggs were collected and set, and 9,558 young birds hatched. 5,481 were lost and 4,077 reared. Of these 1,844 were sent to fish and game clubs for wintering, 856 distributed, 67 sent to the Ayer Game Farm for 1927 egg-stock, 200 to the Wilbraham Game Farm to be wintered for spring liberation, 3 sent away for scientific examination, 1 albino sent to Forest Park, Springfield, 75 shipped to the New Hampshire Commission (in exchange for which they returned 60 to the Ayer Game Farm and 15 later to this station), 205 were distributed as adults, leaving 826 of the 1926-hatched stock on hand the end of the year. To these were added 15 received from the New Hampshire Commission, bringing the total to be wintered to 841. Of these 217 will be added to next year's brood stock, and 624 held for spring liberation.

Of the 532 on hand at the beginning of the breeding season 186 were distributed, 63 lost and 283 remain on hand November 30. These will be held for next year's brood stock.

Marshfield Bird Farm

In addition to the work done with funds contributed by the fish and game clubs, described elsewhere in this report, further construction was done out of the State appropriations, consisting of sub-dividing and completing the brooder houses on the hill and the pens opposite them.

The winter of 1925-6 was an unusually hard one in which to care for birds. During the heavy snows and ice storms the snow drifted so high, in some parts of the yards, as to permit the pheasants to walk on it over the fences, and it was necessary to remove the brailed birds from the large pens. They were transferred to pens in front of the large brooder houses, with the houses for runs. Winter lasted so late that the ice and snow still remained in the brood pens when the time arrived to put in the mated birds. The spring was very cold, with the least sun in the early spring months that has been the case for a long time in these parts. This had its effect upon the young birds, for specimens of the young pheasants which died, all showed, according to the report of the Harvard Medical School, a slight, and some a very decided, inflammation of the lungs, "evidently due to climatic conditions" as "no bacterial infection was apparent."

The year opened with the 1,280 adult pheasants on hand recorded in the last report, plus 57 discovered over previous counts. These were reduced by losses of 38, distributions of 426, and brood stock shipped away (103 to Wilbraham, and 220—of which 1 was lost in transit—to Ayer) to 550 by the beginning of the breeding season.

17,331 eggs were collected, 17,199 of which were set and 10,491 birds hatched. There were 6,111 lost, leaving 4,380 birds reared, of which 300 were sent to the Sutton Hatchery to be held for spring liberation, 169 sent to Ayer for 1927 egg-stock, 2,002 distributed to clubs for wintering, 417 liberated in the covers, 576 escaped during experiments with the brail, leaving 916 of the 1926-hatched stock on hand November 30. Of these 42 will be added to next year's brood stock and 874 will be held for spring distribution.

Of the 550 pheasants on hand at the beginning of the breeding season, 42 were lost, leaving 508 on hand of the old stock November 30.

Wilbraham Game Farm

During the winter, preparations were made for the next year's activities. In addition to the work done with funds contributed by the fish and game clubs, described elsewhere in this report, further construction was done out of the State appropriation, as follows: Repairs were made to the superintendent's house. The foundation walls were strengthened by concrete piers, and extra supports placed under the floors. Five new windows were added to the west and south side of the house, the ell was reshingled, and three ceilings were replaced with sheet rock and wall-board. New wooden bulkheads were built for the house and shop cellars.

A pen for shelter was built inside the large brailing yard. The balance of the wire required to complete the yard was purchased and put on the fence.

There were 1,200 trees planted—Scotch, white and red pine, spruce, and arborvitæ. Considerable green food was planted, but the severe frost of June 17 destroyed the greater part of the first crop. A second planting supplied the green food during the summer, and vegetables for winter feeding.

Because of the disease among the young pheasants in 1925, which may have been caused by bacteria in some of the brood stock and transmitted to the young through the egg, the brood stock was changed entirely as a preventive measure.

The year opened with 571 adult pheasants on hand, which were increased by 103 received from the Marshfield Game Farm, making a total of 674. This number was decreased by 92 distributed prior to the breeding season, and 23 lost, leaving 559 on hand at the beginning of the breeding season.

19,502 eggs were collected, 19,341 of which were set and 6,882 hatched. The failure to obtain a larger hatch was due largely to the defective operation of several large incubators and to the disturbance incident to trucking around the barn. Arrangements were completed to discard these large incubators. Of the birds hatched, 4,417 were lost and 2,465 reared, 2,214 were sent to the fish and game clubs and individuals to be wintered; 1 albino sent to Forest Park, Springfield; 2 sent away for scientific examination; 135 (of which 2 were lost in transit) to the Ayer Game Farm for 1927 egg-stock, reducing the number to 113. To these were added for wintering 200 from the East Sandwich Bird Farm, making a total of 313 1926-hatched pheasants on hand November 30. Forty-three will be added to the brood stock, and 270 held for spring distribution.

Of the 559 adults on hand at the beginning of the breeding season, 39 were lost, 2 escaped and 11 were distributed, leaving 507 adults on hand at the end of the year.

FISH AND GAME DISTRIBUTION

FISH DISTRIBUTION

In other parts of this report the problem of fish distribution has been emphasized. (See Inland Fisheries—Trout). The great need for the improvement of this service is a fleet of fast-going trucks, capable of carrying from $1\frac{3}{4}$ to $2\frac{1}{2}$ tons, and thoroughly reliable, for break-downs on the road are serious when transporting live fish. These trucks should have specially constructed bodies, and should be rigged with the latest appliances for the handling of the largest possible quantities of live fish.

Each truck should be manned by an experienced fish messenger. The State should be divided up into a certain number of zones and a fish messenger permanently assigned to each one. This for the reason that year after year he will become more fully informed of the physical condition of the ponds and streams in that zone, and thus be able to do increasingly effective work. We are all keenly alive to the splendid work that is being done through the distribution committees of the various clubs, and by individuals in regions not represented by clubs; but we believe that the distribution of fish particularly, and of game, will never be on a solid business basis until thoroughly experienced agents of this Division handle the output direct from the hatcheries to the waters and covers.

The routine of fish distribution was as usual; the total expenditure, \$5,939.77.

Tables showing details of the distributions appear at the end of the section, to which reference is made to supplement the following reports on the various species.

Brook Trout.—Egg-planting in brooks was discontinued, as the entire production was required for hatchery operations.

734,255 fingerlings were distributed to public waters from the five hatcheries; 151,300 were sent to the fish and game clubs for rearing and later distribution; and 316,710 fingerlings were held at the stations to be grown to yearlings for spring distribution, pursuant to the present policy of distributing the maximum number of yearlings and the minimum of fingerlings.

The total distribution of yearlings was 110,961 and of adults, 1,089. The distribution of these large fish started after the first of April and

continued through the summer. It is a slow process, for few fish of this size can be carried per can, the number of cans permitted per shipment by rail is limited, very few trucks are available at the hatcheries, and during April many roads were impassable. Many of the clubs co-operated to the fullest extent and materially lightened the work. All of the yearling trout were of legal size, and while undoubtedly many were caught during the open season, probably good numbers escaped to be taken another year as much larger fish.

An experiment in stocking ponds with large trout is under way. It is a fact that very few of our ponds contain trout; but it is believed that good trout fishing can be provided in these waters on the following plan—annually to put extra-large fish into a carefully selected group of ponds. The trout are not expected to reproduce, for it is known that in these big ponds the breeding facilities are limited; and, furthermore, most of the stock planted will be discards from the brood stocks at the hatcheries. This policy has already been followed over a period of years in Peters Pond, Sandwich. This pond contains also black bass, pickerel, and the equally voracious feeder, the Chinook salmon, but the large trout survive and afford very good sport each spring. Nine ponds, one hundred acres or over, either landlocked or with screened outlets, representing different types and involving most of the representative conditions, have been selected for this experiment, namely: Lake Garfield, Monterey; Hampton Pond, Southampton; Hampshire Pond, Westfield; Lake Attitash, Amesbury; Peters Pond, Sandwich; Onota Lake, Pittsfield; Congamond Lakes, Southwick; Baptist Pond, Chelmsford; Lake Archer, Wrentham. The four last-named have not, as yet, been stocked, but this will take place in regular course.

Brown and Loch Leven Trout.—After all the brown and Lock Leven stock had been assembled at the Amherst Rearing Station, where in future it is to be handled, a selection of brood stock was made, and the remaining fish were planted in several streams shown, by past experience, to be suitable for them.

Rainbow Trout.—No distributions were made, the entire stock of 9,646 rainbow trout fingerlings being retained at the Montague Rearing Station for brood stock.

Chinook Salmon.—The Chinook salmon raised at the East Sandwich hatchery were distributed as follows: 14,400 (2-inch) were turned over to the Dighton Fish and Game Club for further rearing and distribution next spring. The 18,000 fingerlings (2½ to 3 inches) reared at the East Sandwich Hatchery were planted in Peters Pond, Sandwich; Ashumet Pond, Falmouth and Mashpee; and Grigson's Pond, Barnstable.

White Perch.—The distribution of white perch was again confined to about twenty-five selected ponds. This is the second year that the Division has indicated to the fishermen in what waters the fish should be planted. It is believed that by this plan all white perch ponds in the State will be effectively stocked after a period of years. This year's group comprises: Peters Pond, Sandwich; Richmond Pond, Pittsfield and Richmond; Stockbridge Bowl (Lake Mahkeenac), Stockbridge; Watson Pond, Taunton; Long Pond, Freetown and Lakeville; Shad Factory Reservoir, Rehoboth; Lake Attitash, Amesbury and Merrimack; Flax Pond (Wennehers Lake), Lynn; Hoods Pond, Ipswich and Topsfield; Fosters Pond, Andover; Locks Pond, Leverett; Five Mile Pond, Springfield; Congamond Lakes, Southwick; Hampton Pond, Westfield and Southampton; Greenwich Lake, Greenwich; Norwich Lake, Huntington; Nabnasset Pond, Westford; Mascuppick Lake, Tyngsboro and Dracut; Waban Lake, Wellesley; Houghton Pond, Milton; Lake Pearl, Wrentham; Tispaquin Pond, Middleboro; Robbins Pond, East Bridgewater; College Pond on Myles Standish State Reservation, South Carver; Flints Pond, Grafton, Shrewsbury and Worcester; Shirley Reservoir, Lunenburg and Shirley; Turkey Hill Pond, Paxton and Rutland;

Hardwick or Muddy Pond, Hardwick; Dennison Lake, Winchendon; Rocky Pond, Northboro.

The account of the salvage work by which these white perch were secured, follows.

Work of the Salvage Unit.—As in the year previous, a shortage of funds made it necessary to limit the salvage work to the taking of white perch from Tashmoo Pond on Martha's Vineyard. The warden in charge reported early in April that he was getting plenty of fish, but working under difficulties and very trying conditions, for the prevailing heavy winds and low temperatures, accompanied by rains and snow, caused the crew much suffering from exposure to heavy, biting north-west winds, and every morning found the pond and the equipment iced up. Between March 21 and May 1 there were collected and shipped 86,500 white perch (4 to 6 in.).

In June, the gear which had been used for collecting white perch was transferred to Long Pond, Falmouth (a water supply, closed to public fishing) for salvage work requested by the town officials, who paid all expenses. Two wardens performed the work, and collected 1,400 adult small-mouth black bass (10-14 in.) and 600 adult yellow perch (10-14 in.). These were distributed in ponds in Falmouth where public fishing is permitted.

Several small salvage jobs were accomplished, and the fish planted, for the most part, locally:

By wardens: from private pond of William Parkman of Oakham, 350 horned pout yearlings (5-7 in.), shipment of pickerel being given in exchange; from a mud-hole on Fort Hill Farm, Littleton, 20 horned pout yearlings (6-7 in.); from North Watuppa Pond, Fall River, 160 small-mouth black bass adults (10-15 in.).

By John H. Tarment, of the Foxboro Fish and Game Association, from private pond of E. H. Bristol of Foxboro, 660 adult pickerel (averaging 14 in.); 1,515 adult horned pouts (averaging 8 in.); 28,500 horned pout fingerlings (1¾ in.). The fish were collected, and distributed locally, on the understanding that in future, fingerling and yearling trout of equal value should be turned over to Mr. Bristol, the value of the stock in exchange to be determined by this Division.

Small-mouth Black Bass.—The small-mouth black bass distribution was conducted on a plan similar to that for the white perch. A second group of ponds received attention this year, as follows: Spectacle Pond, South Sandwich; Seymours Pond, Harwich and Brewster; Dennis Pond, Yarmouthport; Long Pond, South Yarmouth; Scargo Lake, Dennis; Lake Garfield, Monterey; Clarksburg Reservoir, Clarksburg; Davols Pond, Westport; Sassaquin Pond, New Bedford; Swansea Reservoir, Rehoboth; Chadwick Pond, Haverhill and Boxford; Hoods Pond, Ipswich and Topsfield; Baldpate Pond, Boxford; Ashfield Pond, Ashfield; Moores Pond, Warwick; Congamond Lakes, Southwick; Lake George, Wales, Watershops Pond, Springfield; Nashawannuck Pond, Easthampton; Baptist Pond, Chelmsford; Upper Mystic Lakes, Winchester; Goshen Reservoir, Goshen; Nabnasset Pond, Westford; Lake Walden, Lincoln and Concord; Ponkapoag Pond, Canton and Randolph; Massapoag Lake, Sharon; Lake Archer, Wrentham; Lake Waban, Wellesley; Nippinicket Pond, Bridgewater; Sampsons Pond, Carver; White Island Pond, Wareham and Plymouth; South or Quacumquacit Pond, Brookfield and Sturbridge; Fort Pond, Lancaster; Coes Pond, Worcester. Another series of ponds suitable for bass is now in process of investigation.

Horned Pout.—No horned pout were purchased this year, and the entire output consisted of fish purchased last year from the Carter Ponds and held through the winter; the product of the Palmer Hatchery; the fish collected from Stockwell Ponds; and those salvaged in miscellaneous jobs.

Blue Gills.—Blue gill stock distributed consisted of yearlings (2½ to 5 inches) collected from the pond at the Palmer Hatchery, together with the output of the Stockwell Ponds.

Pickereel.—From the water supply pond at the Palmer Hatchery a number of fingerlings and adults were taken when the pond was drawn down, and distributed, together with those collected from the Stockwell Ponds, and a few small lots.

Yellow Perch.—The only yellow perch distributed were those from Stockwell Ponds, and those salvaged in Falmouth.

Alewife.—Spawning adult alewives were transported from old breeding grounds or streams in which they were running in good numbers, to the depleted waters listed below: Monponsett Lake, Halifax, 406; Lake Nippenickett, Bridgewater, 1,321; Town River, West Bridgewater (just above the Stanley Iron Works fishway) 201; Town River, West Bridgewater (just above the Jenkins Leatherboard Co., Prattown), 131; total, 2,059.

Fish Distribution to Public Waters, 1926

	Product of State Hatcheries	Not Hatch- ery Product (seining, gift, purchase, etc.)
Brook Trout:		
Fingerlings	734,255	
Yearlings	110,961	
Adults	1,089	
Brown Trout and Loch Leven Trout:		
Fingerlings	9,025	
Yearlings	14,320	
Adults	13	
Rainbow Trout:		
Fingerlings	250	
Chinook Salmon:		
Fingerlings	18,000	
Small-mouth Black Bass:		
Fry	137,000	
Fingerlings	31,550	
Yearlings	650	
Adults	8	1,560
Horned Pout:		
Fingerlings	104,575	28,500
Yearlings	6,325	370
Adults	12,082	1,515
Yellow Perch:		
Yearlings	19,050	
Adults		600
White Perch:		
Adults		86,500
Blue Gills:		
Fingerlings	134,300	
Yearlings	5,375	
Pickereel:		
Fingerlings	3,450	
Adults	658	660
Alewives:		
Adults		2,059
	<hr/> 1,342,936	<hr/> 121,764

Fish Distributed to Clubs for Rearing to Larger Size Before Liberation

Trout fingerlings (1½ to 2 inches):		
Worcester County Fish and Game Association	.	75,400
Canton Fish and Game Association	.	25,000
Peabody Fish and Game Association	.	36,500
Chinook Salmon fingerlings (2 inch):		
Dighton Fish and Game Club	.	14,400
		<hr/> 151,300

GAME DISTRIBUTION

Pheasants.—The pheasant eggs distributed to clubs and individuals for hatching were produced at the Ayer Game Farm, from a fine lot of healthy stock, and the sportsmen received from this egg stock the same quality eggs as are used at the other State game farms for producing pheasants.

Many of the recipients of eggs in 1925 succeeded in hatching and rearing, to proper age for liberation, a high percentage of birds from the eggs shipped to them. Of the 12,333 eggs sent out in 1925, there were hatched 4,282 pheasants, of which 1,619 reached the age for liberation. On the whole, the results obtained were disappointing, for the number of birds eventually liberated was extremely low as compared to the expense of maintaining the station which produced the eggs.

The question of discontinuing the distribution of pheasant eggs is now under consideration. It is yet to be decided whether the net result of this work justifies the outlay, or whether an equal amount of money, expended in rearing young birds, would not give more satisfaction in the long run. There are two ways of looking at it—the value proceeding from the birds actually reared, and the stimulation of interest in this work. Undoubtedly some of the clubs have taken on the rearing of pheasants through the winter as an outgrowth of their early interest and experience in hatching pheasant eggs provided by this Division.

The 13,255 pheasant eggs sent out for hatching in 1926 resulted in 6,607 birds hatched, and 2,887 liberated.

Last year saw the beginning of the policy of rearing as many pheasants as possible to maturity before liberation. The game farms carried over from 1925 into this year as many young birds as their plants could accommodate, and the clubs and a few individuals carried through 2,461. These clubs and individuals report 1,555 of that number were liberated in the spring of 1926, and 42 retained for egg-collection and subsequent liberation.

This year the same plan was followed. The game farm accommodations were increased to the extent our funds permitted, but it was necessary to call on the clubs again to take part of the young stock off our hands when from one-third to one-half grown, to make room for the on-coming hatches. When the stations are full to capacity, and new hatches are coming along, they must either be relieved in this way or the stock must be turned loose. This year the clubs came to our assistance by taking off our hands, 6,060 young birds, and it was necessary to distribute as young birds from the East Sandwich and Marshfield Game Farms, nearly 1300 pheasants when quarters became crowded and no local clubs had accommodations ready at the time. Our own stations are carrying over into next spring 2,094, which represents a substantial extension of last year's accomplishment.

Every adult pheasant distributed this year was banded, each farm using a different colored celluloid, copper-mounted band, as follows: Ayer, bright red; East Sandwich, light green; Marshfield, dark blue; Wilbraham, bright pink. The egg-stock liberated from the Ayer Game

Farm last year was banded, and this year the practice was extended to all stations. A card record of each band is kept, with the point of liberation, to which is added (when the band is returned by the gunner to whom the bird falls) the data covering the place and time of capture. In time these records should yield valuable information concerning the movements and history of the liberated birds.

White Hares.—The order for white hares placed in Maine was for 2,000. There was again a shortage of hares, and as the trappers experienced great difficulty in obtaining them, our order was by no means filled. December and January were extremely open months, with very little snow, and as it has been the Division's aim to delay distribution of these hares until as near the close of the shooting season as possible, this prevented us from obtaining the full number. The distribution period extended from January 21 to March 31. Only 1,625 were received (of which 696 were imported after the season closed). In future it is planned to start shipments earlier, even though the animals will be exposed to the gunners, rather than to delay shipments until too late to obtain them.

Cottontail Rabbits.—217 cottontail rabbits, purchased in Kansas, were distributed. Also 24 which were trapped on Penikese Island and shipped to the Fall River Rod and Gun Club for field trials, were liberated afterwards.

Miscellaneous Distributions.—Two adult pheasants confiscated by a warden, and 2 young from a broken-up nest, were liberated; and 1 adult cock pheasant which flew through a window in West Lynn was turned over to the Peabody Fish and Game Association to be wintered.

The cost of game distribution was \$1,229.26.

Game Distribution to the Covers, 1926

	Product of State Hatcheries	Not Hatchery Product (Pur- chase, gift, etc.)
Pheasants:		
Eggs ¹	— ¹	
Young	1,273	2
Adult	1,313	3
Cottontail Rabbits:		
Adult	24	217
White Hares:		
Adult		1,625
	<hr/> 2,610	<hr/> 1,847

¹ 13,255 pheasant eggs were distributed for hatching and subsequent liberation.

Pheasants Distributed to Clubs to be Reared to Adults for Spring Liberation

68 fish and game clubs and individuals wintered . . . 6,060

MARINE FISHERIES

GENERAL

For several years, through one medium or another, we have been calling attention of the public to the fact that the marine fisheries, one of our oldest industries, have received little or no financial assistance from the State.

This industry stands in a most important relationship, not only to

our own citizens, but to the entire country—in that it is concerned with the production of a very valuable food supply at a reasonable cost.

For many years the State has annually expended substantial sums of money in the interest of agriculture. We fully believe in this policy, and that agriculture deserves all of the consideration which the State, financially or otherwise, can give it. We also feel that the fishing industry, which is likewise concerned with the food supply, should receive a liberal appropriation from funds raised by general taxation.

Among other things the division of Fish Inspection should be enlarged by the addition of more inspectors, with an increased operating allowance for each man. These inspectors stand between the fish producers and distributors, and the fish consuming public. Their activities have resulted in a higher quality of fish passing to the consumer than ever before in our history. It stands between the retailer, who may be tempted to unload an inferior article, and the housewife who may not appreciate the difference in quality. It likewise insures to the retail dealer, fish of increasing quality from the commercial dealer.

The inspection of trips upon arrival at the dock has caused the skippers to take greater pains to properly ice and handle their product while on the fishing grounds, in transit, and unloading. At the present time the inspector and his two deputies cannot possibly cover the entire field. Only three inspections can be made annually of the retail establishments, and in periods of heavy arrivals it is difficult for the force to cover all points.

INSPECTION OF FISH

This work is proceeding along the same conservative lines that have marked its good-quality-fish effort since organization in the latter part of 1919. With its limitations definitely laid down by public statute, it offers perhaps little opportunity for bright points that would lift an annual report of its efforts and results above the usual perfunctory level.

And yet this year's story of fish inspection work, the value of which is now admitted and appreciated by fish catcher, fish seller and fish consumer alike, can present features that should be of marked public interest.

The inspector of fish has had under his ken, with his two deputies, during the past year, at least two hundred and fifty million pounds of fish. This is an increase in the amount inspected last year and the pleasing note here is that, with the inspection line drawn as rigidly as is fitting with the "good fish" standard, and practically the same number of inspections, by the same men; it was found necessary to condemn a less number of pounds of fish than during the previous year, the amount for 1925 being 283,500 pounds and for 1926 111,578 pounds. This indicates an increased effort on the part of the fishermen and the fish dealers, both wholesale and retail, to live up to the standard set by law. Of course there are those within the ranks of both the above mentioned classes who might be classed as not in perfect accord with the work and from these sources naturally comes the greater portion of the "poor fish" troubles with which this office has to deal.

Notwithstanding the landings of fresh fish have been the largest in the history of this state, the inspection work has covered a larger part of the total annual catch than ever before.

The force now at the command of this office to handle fish inspection duties is inadequate to meet the work put upon it. The fish landings at Massachusetts ports and the imports of fish to Massachusetts fish centers, both fresh and frozen, have been increasing in the past three or four years. The inspector of fish with only two deputies at his command finds it practically impossible to cover the whole situation as he feels it should be done. The fishermen will be more willing to co-

operate if all trips are inspected. The number of inspections of wholesale and retail plants should be doubled in order to give the public the protection it should receive.

In connection with the effort of many of the wholesale and retail dealers to co-operate with the work of this office, which they unhesitatingly do, as they find it to their advantage so to do, still there are others who possibly honestly desire to live up to the law but from lack of experience or knowledge of how to even conduct a fish market, "fall down" on the job with the result that they find themselves haled into court. For this reason this office has prepared a pamphlet on "Hints to Dealers" which it proposes to put out to all retail dealers upon application for the same.

Court Cases

Owing to severe storms during the early part of the year, the deputies were handicapped in their inspection work, especially in the central and western part of the State. However, when weather became normal and roads were restored to passable condition, inspections all over the state were resumed; so that every retail store known to this office has received two or three or more inspections during the year. It has not been and it is not now the policy of this office to persecute; rather it is the idea to assist the dealer, to point out to him his mistakes, to condemn what bad fish he has on hand and to give him another chance. If, however, in the course of the work, flagrant cases are observed and persistent violators come to our attention, then there is no hesitation in taking the matter to court. In this way, it is the idea of the office, that the public is safeguarded in its purchase of good fish and at the same time the fishing industry as a whole is not trodden under foot because a few irresponsibles choose the bad way.

Inspection at Producing Points

Inspection at producing points has been done this year as usual, by the inspector himself. The usual ports have been inspected; Gloucester, Boston, New Bedford, Nantucket, Marthas Vineyard, Provincetown, Chatham, Woods Hole, Wareham, and other Cape Cod places. At each of these places conditions were found above the average, except in one or two instances at Provincetown where it seemed to the Inspector that less delay in the landing of whiting at one of the freezers would insure this delicate and easily injured fish being put in frozen condition in much better order if the delay was not so apparent.

Work Accomplished

Inspections in retail stores, 2,219.

Inspections in wholesale stores, 18,361.

Freezer inspections, 336.

Inspections of peddlers' carts, about 300 weekly at Boston Fish Pier.

Inspections at Yarmouth, N. S. steamer, 100.

Vessel inspections at Gloucester, 273.

Vessel inspections at outlying ports, 234.

General inspection trips, 9.

Fish condemned at Boston Fish Pier from vessels, 14,350 pounds.

Fish condemned at Gloucester, direct from vessels, 52,000 pounds.

Fish condemned in retail stores, 3,186 pounds.

Condemned at Fish Pier from consignments on Yarmouth, N. S. steamer; graded as "jellied", 44 swordfish—13,784 pounds.

Condemned, landed at Boston from Canada by rail and steamer, 5,340 pounds smelts.

Condemned, landed at Boston Fish Pier: arrived by rail, 239 pounds scup; 510 pounds bullheads; 35 pounds eels; 2,250 pounds whiting; 271 pounds striped bass; 750 pounds sardine herring; 100 pounds butters; 400 pounds spawn.

Condemned, landed at Boston Fish Pier: graded as "jellied," 78 sword-fish—18,363 pounds.

Total amount condemned at Boston Fish Pier and at Boston from Canada by rail and steamer, 56,392 pounds.

Total inspections, 21,532.

Total fish condemned, 111,578 pounds.

Total court cases, 14.

Total convictions, 10.

Blackstone Street Fish Market

This open air market where push cart peddlers have done business on Saturday afternoons and evenings for a great many years, is now carrying a grade of fish which, generally speaking and with some exceptions, marks up to the standard desired by this office. Cart owners or dealers claim they have never before carried such a good grade of fish and listening in to conversations of buyers, who are of the shrewdest sort, confirms that opinion.

This improved condition of affairs has come about perhaps, or possibly, through efforts of this office. For instance, in mid-summer fish were found on several carts in large quantities which not only did not measure up to the quality standard, but were absolutely unfit for food. Fortunately, a deputy inspector was on the scene and promptly not only condemned the goods, but had them destroyed. An investigation by this office showed that the carts on which these fish were found were conducted by men employed during the week on the Boston Fish Pier by Boston Fish Pier concerns. In probing further it was found without question that these unsavory goods came from the Boston Fish Pier, yet the task of proving ownership was so complicated as to prevent this office from taking the matter to court with any hope of favorable decision.

The Inspector of Fish then took recourse by recounting conditions and on August 11th the following letter was sent to the New England Fish Exchange and also to the Boston Fish Bureau. This same letter, on August 18th, was sent to the wholesale fish dealers of Boston, Gloucester and outside ports.

The letter was as follows:

"It often happens that this office, in performing its fish inspection duties, condemns fish at the Blackstone Street market on Saturday afternoons and evenings.

On investigation I find the bulk of these unfit-for-food fish come from the Boston Fish Pier and that some financially interested in carts at Blackstone Street are employed at the Fish Pier.

The point of the above statements is obvious. The Fish Pier cannot afford to have the Blackstone Street market known as an outlet for its unfit-for-food fish that it could not otherwise sell, or would not sell to its regular customers.

The fresh fish business, at present, is being conducted quite generally on a quality basis so it seems too bad that some concerns should allow fish unfit for food to reach the poorer buying class of people through the medium of men who are known to be in the employ of the Fish Pier concerns for years.

I therefore ask your organization to adopt such stringent rules as may prevent in the future any fish of doubtful or unfit-for-food quality reaching the hands of anybody who might sell it for food at Blackstone Street or anywhere else, and to this end I suggest that all poor fish be so cut, hacked, mutilated or severed into small pieces as to preclude its being offered for sale anywhere.

With an expression of appreciation for considerable evidence on your part during the past few years to co-operate, for a good fish standard, with the fish inspection work of the Commonwealth, I remain,

As a fish dealer you are asked to assist in preventing poor quality fish from reaching the Blackstone Street market, Saturday afternoons and evenings, through ANY channel."

It is felt that while these same men are still pursuing their business at the Blackstone Street Market, the letter has had its effect, from the fact that since that date and with the most rigid inspection every Saturday afternoon and evening, no fish unfit for food have been found on any cart; indeed on most occasions the fish offered for sale have been of good quality. So much for going to the fountain head.

Work at the Freezing Plants

The public cold storage plants handling fish have been given many inspections during the year and conditions have been found generally satisfactory. The inspector and his deputies have no jurisdiction over private freezing plants. The office, however, has an oversight of goods going into these freezers, and it can be said that the fish taken into these private freezers has in the main been quite satisfactory and yet by reason of inexcusable delay in handling, some cases have been found where the goods could not be actually condemned as unfit for food, still they approached the border line.

General Notes

Strict watch has been kept on any possible receipts of Japanese frozen halibut in Boston, it having become generally known in the fish trade that some of these fish had arrived at Canadian Pacific ports in a condition which did not appeal to dealers and shippers as first-class. But one doubtful lot was found in Boston and these fish were without question of the second and third grade. Inspection, however, found nothing in the consignment that could be condemned under the state fish inspection laws, but it was a relief to find that the total shipment was quickly and satisfactorily taken care of outside of the state.

Inspections of salmon, especially during the weeks of June 17 and July 4 were made as usual and on the whole the fish were found to be in unusually good order. Frozen smelts from New Brunswick came through in very good shape. This office had, during 1925, to condemn several thousand boxes of these fish and it is taken as indicative of the lesson taught thereby that the smelts this year from Canada, shipped to the Boston consignees, were of no inferior grade. The same remark applies to swordfish from Nova Scotia and Cape Breton. Last year it was necessary to condemn quite a large number of these splendid fish, some weighing from 300 to almost 500 pounds, each fish representing a value at first hand of from \$75 to \$125. When a fish of this size is condemned it means a great loss to the Nova Scotian fisherman who caught it. This year's consignments showed much better care. Pacific halibut shipped to Boston came through generally in good order. Sick or "logy" codfish from the vessels of the fleet landing at the Boston Fish Pier and Gloucester were put under strict inspection and many thousands of pounds were promptly condemned. In this part of the work this office had the help of most of the captains of the fishing vessels and most of the dealers.

The groundfish landed at the Boston Fish Pier this year, taken as a whole, showed an effort on the part of the fish catchers to co-operate with the work of this office to the end that only good fish should be landed and sold. True it is, (as is to be expected) some poor fish reached the market. Doubtless some of these poor fish reached the retail markets and the consumer, but speaking broadly it is safe to

say that the landings of fresh fish at Massachusetts ports for 1926 showed a gradual rise on the quality thermometer, and for this most desired attainment this office has to acknowledge the hearty co-operation of the great majority of the fishermen, captains, vessel owners and fish dealers.

An active part of our work has to do with shipments to Boston of fish from the lake and river districts of the middle west, including the Great Lakes, etc. These consignments total in the vicinity of four million pounds. They are shipped "round"; that is, they are not cleaned or gutted. These fish are for the Jewish people and since the beginning of the work of this office every effort has been made to see that they come through in first-class condition. That inspection has had its effect is evidenced by the fact that out of the four million or more pounds brought into Boston during the year it was necessary to condemn not one pound. The Jewish retail fish dealers buy their fish from day to day for their trade. Nothing is carried over, therefore it is easy to realize just why there is so little trouble in this direction. The answer is, quality.

Conclusion

In last year's report this office mentioned the fact that one of the largest chain store companies operating in this state had declared its intention of selling fresh fish daily at certain of its stores. Because of this it seemed almost certain this action would be duplicated by other chain store factors. This concern alluded to has been handling fish throughout the year in quite a number of its markets and is now intending, as we have been informed, to put fish departments into 172 of its stores throughout the Commonwealth. Another chain of stores has already, within the confines of greater Boston, established fresh fish on counters in 15 stores, with the intention, we are notified, of adding to this list throughout the state as rapidly as locations can be secured.

These chain stores serve a large portion of the people of this Commonwealth and their offerings, the same as those of retail fish markets or wholesale fish markets, should most certainly receive careful inspection. It must be evident that this will entail much more work and therefore more men and maintenance funds are necessary if the character of the work now given by this office is to be maintained. In other words, more men and more money are needed to meet properly the natural increase in the work, caused by increased receipts, increased sales and increased use of Massachusetts caught fish.

THE DEEP SEA FISHERIES

The deep sea fisheries of Massachusetts for 1926 were pursued with profit and marked by increased landings. The year was a good one viewed from any angle of the industry. More fish were caught, more fares were landed, vessels took shorter time in making their trips, hence a marked rise in the quality thermometer; there was no one particular line of the industry that was depressed to any great extent, while on the other hand, some branches showed such marked increases as to cause most favorable comment and research to the musty tomes of the fabled "good old days" to find the equal—and in some cases the equal was not found.

The winter haddocking fleet enjoyed a most successful season. It may seem strange to say that this success was based on tempestuous weather, which prevailed in several periods during the winter months, thus curtailing the catch, while increasing the danger to the men who brought in the fish, but it is a fact that quicker trips were made, more trips were landed than in the previous season and strange to say the

total at the Boston Fish Pier for the winter fleet varied from the previous year so few pounds as to make it not worth mentioning and also prices held at a higher range throughout the whole winter season.

The summer fresh fishing fleet, as usual, cared for the Boston wholesale fresh fish market in abundant shape. The splitting market at Gloucester was also adequately covered. The vessels fishing for the splitting and curing market, finding that there was no demand for haddock unless these fish could be sold at less than \$1 per hundred weight (which simply precluded their catching), did practically all of their fishing to the eastward, on the Middle Ground, a famous and prolific fishing spot in the vicinity of Sable Island, from whence a largely increased amount of codfish was landed on the Gloucester wharves in a condition which would, in general, challenge the admiration of any food export.

The swordfishing fleet, after meeting with reverses for the past two or three years, came into its own this year, with the result that the catch was almost 85% ahead of last year's figures. In addition to this, the fleet made the largest single day's record ever hung up in this industry, when on July 6 it landed at the Boston Fish Pier 1,531 fish; and it is interesting here to note that every vessel at the Pier had made a very quick trip, none being over 12 days.

Prices averaged for the season higher than ever before in this history of the swordfishery; indeed it seems almost impossible under present conditions to supply the demand of the public for fresh swordfish.

The fresh halibut fleet, aided by many wonderfully large trips during the year and also by a well sustained market which called for high prices from start to finish, fared well. The fleet was not as large as last year and during the season, because of the lure of the mackerel business, was deserted by some of its leaders, nevertheless managed to land only a few hundred thousand pounds less than the fleet did the previous year. Notwithstanding this bright presentation, there is reason for grave concern as to the future of the halibut fishery in Atlantic waters, for the reason that yearly for the past four years there has been a steady and gradual decline in the catch and whatever may be said or done and whatever may be anybody's thought, high prices cannot make up for an evident diminution of supply.

The Crisis in the Flounder Industry

What reached the proportions of a crisis in the flounder fishery and seriously affected a fleet of 50 or more large, high-powered fishing crafts and the fishing business of the port of Nantucket as well, was met and successfully solved and handled by this Division. It was a very serious problem, entailing a possible money loss to shippers, owners and crews of at least half a million dollars.

This office was notified on November 9 that flounders shipped out of Nantucket, or fares caught on Nantucket grounds, were being rejected by the New York buying concerns on the ground that the fish had a strong "carbolic" taste. The notifying letter also stated that so serious was the condition that many of the fishing boats were laid up at the wharves and that what practically amounted to an embargo was on. The letter also requested the sending of a Division man to Nantucket to look over the situation and see what could be done. The matter was promptly attended to and on November 10 the Director ordered the state inspector of fish to take up the whole matter.

A trip to Nantucket showed that the conditions stated in the letter of November 9 had existed for at least four or five weeks. Some 15 or 20 fine fishing crafts were hauled up alongside the wharves of Nantucket lying absolutely idle. A fleet of some one dozen crafts of the same class were fishing for quahaugs on the grounds inside of Great Point, in a laudable effort to "keep going." It can be said here that

these crafts were making good money. Some two or three crafts, also of this fleet, engaged in the scallop fishery, and also were being financially recompensed fairly well for their endeavors.

The Inspector went over the situation with some shippers, fishermen, captains, owners and others who have the welfare of the Nantucket fishery at heart. He found conditions very serious. He found the New York concerns had withdrawn their buyers from Nantucket and when the inspector states that in a previous year he has seen and met some 20 buyers on Nantucket wharves, what this statement really means is obvious.

It appeared that some flounders taken on a certain small piece of fishing ground lying from eight to ten miles east by north from the Pollock Rip Lightship and in from 20 to 22 fathoms of water had been rejected at the New York market because it was claimed by these dealers that the fish had a strong taste when cooked and also a strong "carbolic" smell through the gills when landed.

It can be seen from this that the situation was really one which threatened practically the welfare of the flounder fishery by reason of the fact that 75% of all Massachusetts caught flounders reach the New York market.

Some of the captains and owners complained that fares of fish not taken on the so-called "carbolic" grounds were given returns which stated that the small financial settlements were due to the fact that the fish were taken on this particular piece of fishing ground whereas a matter of fact they were taken many miles from there. This situation, stated as above, is obvious to anyone connected with the fishing industry.

It was at this juncture, after this situation had prevailed from some four to five weeks, that the aid of this Division was invoked. The inspector of fish conferred with fishermen, captains, vessel owners, shippers and other interested parties at Nantucket and before leaving arranged for the shipment, to the Marine Biological Laboratory at Woods Hole and also Dr. Tyzzer of the Department of Comparative Pathology at the Harvard University Medical School, of flounders taken from the so-called "carbolic" grounds and also from grounds supposed (or admitted rather), to be remote from this alleged troublesome location. This plan was carried out by securing one of the flounder fishing crafts to go out and make a trip especially for the purpose. The flounders were iced and shipped in regular Nantucket style, reached their destination in good time and the result was that an exhaustive examination, made by the above named authorities of the contents of each barrel shipped. The matter being one of such grave import to the flounder fishing interests and flounder fishermen in general, it is thought wise to give here the reports in detail which were submitted to this office.

The report of the Biological Laboratory, made in two letters, is as follows. The first letter reads—

"Dr. Allee, a scientist from the University of Chicago, who is doing some investigating here at the Laboratory, for a while, is assisting me in trying to determine the trouble with the flounders.

"We examined some yesterday afternoon and shall finish the others this morning. I am writing you this brief account this morning so that you will get some idea of what we are doing and the next mail doesn't go out until late afternoon. We do not have many mails here a day.

"The fish when received seemed to be in very good condition. The ones that we opened the stomachs contained, to our surprise, hydroids, sea anemones and some forms of bryozoa, not yet wholly determined. In the intestines were beach fleas and other small crustacea.

"There was quite a strong odor in the stomach, more so we think than in the intestines, while the parasitic worms were in the intestines. The odor seemed to come from these macerated or comminuted anemones and hydroids and other small things which they had eaten.

"Dr. Allen and I each took a fillet or steak from two of the flounders which we examined to test out the eating qualities. I found mine very good and Dr. Allee reported the same this morning with the exception that he found one place where it was a little strong and that was where the portion of the fish came from over the viscera or stomach, otherwise he found it all right.

"We each of us also tried eating some fish of the same kind from another locality. This seemed to be a little more tender, otherwise I doubt if I could have told any difference except that the ones you shipped to us were, to say the least, under suspicion.

"This morning early I went to the Laboratory and took two or three steaks from the fish which we had dissected yesterday afternoon taking these steaks from over where the viscera had been, only the viscera had previously been removed, but these had lain on the cement floor over night and it is not to be wondered if they were a little strong.

"They had a slight odor, I would not suggest it being a carbolic odor however. I took these pieces home, washed them, and fried them, and while they were possibly a little strong yet were not unpalatable.

"I also removed the ovary or spawn from one of the flounders which had lain on the floor over night and found it sweet smelling. I also cooked it and ate a part of it and it seemed all right.

"At the present writing there is one suggestion which comes to me that will have to be tried out. It seems to me that if the fish were cleaned, that is what the fishermen call "gutted," in other words, the viscera removed, stomach and intestines, then iced the chances are a great deal of that odor will be eliminated. This should be done immediately after they are caught.

"To my mind there is no question but what it is the food which the flounders seem to be eating at this time and where the fish are iced without being eviscerated there is a chance for this odor from the digested of half digested food to permeate through the fish therefore as a preliminary suggestion I would advise a barrel of fish having their viscera, that is stomach and intestines taken out immediately after being caught then shipped on ice and see if they will not pass muster through the fish markets.

"If there was time and convenience I would say a slight washing out of the cavity where the viscera had lain, would be helpful.

"We hope, however, to have a much fuller and more complete report to send you on this afternoon mail as the investigation of the remaining fish may bring something additional to light.

"Mrs. Gray was cooking codfish for supper when I reached home last evening and I liked the flounder better than I did the codfish and the cooked codfish this morning had a stronger odor than the raw flounder which latter seemed to be sweet and fresh.

Sincerely yours,

(Sgd.) GEORGE M. GRAY,
Curator."

Mr. Gray's second letter reads as follows:

"Dr. Allee and I have gone through the whole barrel of flounders opening every one and examining the contents of the stomachs and intestines. There were 15 of these which had the tails cut off. Of this lot three or four averaged a little stronger in odor than the others but we consider that even these three or four would under ordinary conditions have passed through the market for food without question. These without exception had the alimentary tract clogged or gorged with hydroids or with mud tubes of worms.

"Such fish might very well develop into an unedible condition if they were allowed to become slightly stale.

"The fact that these fish were under a ban or suspicion would lead some to imagine conditions which an impartial or unbiased person

would not find existed. We tried, in dissecting these, to be impartial or unbiased and we feel that at any other time fish having this same odor would be considered all right and that it was a general fishy odor. We ate of the strongest smelling fish.

"We found that the fish which had gotten rid of most of their sperm and eggs had gorged themselves on hydroids, sea anemones, worms in tubes and some crustacea. Those which were still carrying most of their eggs and sperm had comparatively little food in their alimentary tract and these were less noticeable as to odor.

"Of the fish with tails there were 20 and with few exceptions most of these had eaten nothing and their spermaries and ovaries were very large. The food of those which had eaten consisted largely of sponges, a small percentage of others had eaten small crustacea and one had eaten some hydroids. On the whole there was a decided difference in the food of these fish as compared with the 15. These 20 fish having whole tails averaged a bit smaller but seemed to be in excellent condition.

"If the barrel which we received is a fair sample of what has been going through the markets we would say that in our opinion there has been too much agitation over these. Of course, Dr. Allee and I do not know where or how, or under what conditions this agitation started and it may have been justifiable in the beginning. We of course, are reporting only on the fish which we handled.

"If the agitation still persists the only remedy that we see, at present, is as stated in this morning's letter, for the men to "gut" the fish.

"I might add that as regards the odor of the first lot of fish we obtained almost precisely the same odor by taking some live sea anemones and cutting them up into small pieces.

"If there is any way in which we may be of further assistance we shall be very glad to do what we can and trust you will not hesitate to call upon us."

Dr. Tyzzer's report is as follows:

"On November 16 we received a consignment of flounders packed in a barrel of ice with a tag indicating that those with tails cut off were from Pollock Rip. A number of fish of both sorts were examined at once. The Pollock Rip fish appeared to be healthy and plump with the stomach and intestines distended with food material. Most of the samples were larger than the fish from the other source. The flesh of both types had no bad odor and appeared normal in every respect. On boiling, it was thought that the flesh of the Pollock Rip fish did not have so pronounced a fishy odor as the others. Fish of each group were taken home and after cooking by frying, there appeared to be no disagreeable odor or flavor in either group. When the fish were received, it was thought that the livers of the Pollock Rip fish had a peculiar "brassy" odor that was absent in the others, but after keeping 24 hours, this was just as pronounced in the other group.

"There was great variation in the food taken by different individual fish, the Pollock Rip fish showing in a greater proportion of cases a preponderance of marine worms (Annelides) although some also showed small, bivalved molluscs, and in one the contents consisted almost wholly of a long crustacea. The stomach contents of the other group in most cases showed small sponges, crustacea similar to those found in the Pollock Rip fish, but no marine worms.

"It appears to me that all of these fish as received should be considered as wholesome for food purposes, in fact the Pollock Rip fish appeared better nourished and showed much more food material in stomach and intestines. Assuming that "the customer is always right," it is possible that the group of fish in question may be getting a peculiar type of food, which after the fish have been kept for some time imparts a peculiar flavor. I believe that retail dealers recognize the

fact that certain species of fish when feeding upon certain material spoil much more quickly if they are not gutted at once. It also seems probable that fish in which the stomach and intestines are distended with food material will show what the retailers call "burning" in the region of the nape, a process due to digestion and decomposition in the region of the viscera much more quickly than in fish that are practically empty. This difficulty might be met to a large extent by prompt marketing after careful icing and some provision for gutting the fish as soon as possible after they are taken from the water.

"To summarize, the Pollock Rip fish appear to be normal in every respect but show evidence of much more abundant feeding than the other specimens submitted. Furthermore, there is evidence that they obtain somewhat different food. As received, they have no peculiar odor or flavor, either fresh or after cooking."

These letters were followed by supplementary ones from the same sources affirming that the fish examined by them were in every respect fit for food.

The prompt action of the Division in this matter met with general commendation from the flounder fishermen and boat owners in general and knowledge of what had been done evidently reached New York buying sources, for shortly after the reports were made public, word was received by the Director from Nantucket that it would be unnecessary to go to New York to investigate the situation there as the New York dealers were again buying flounder fares and paying good prices, that some of them had also replaced their buyers at Nantucket and were soliciting anxiously for flounder shipments.

It would seem that work of this kind, done without display or ostentation and yet producing the results, must meet with general approval and it is with no small feeling of pleasure that the Director notes several letters received from leading people in the flounder fishery commenting highly upon the work of the Division.

It should be also noted in this connection that the Woods Hole Station of the United States Bureau of Fisheries, through its superintendent, after having the opportunity of reading the reports of Curator Gray and Dr. Tyzzer, informed this office that the findings of the two men mentioned were amply substantiated by a number of analogous cases where other species of fish were concerned.

Record Year for the Mackerel Fishery

When the auxiliary powered crafts Orion and Mary A. sailed from Gloucester on Saturday, March 27, their skippers, Captains Dahlmar and Scolla, raised the curtain on what proved to be, in the opinion of this Division, the most successful mackerel fishing season the Massachusetts coast ever experienced. Data of mackerel catches back from 1804 to the present time will confirm this statement.

The two crafts above mentioned sailed to engage in the southern mackerel fishery and so great was the desire of other bright-minded captains to get on the ground early, that in one week twenty had sailed, the total southern fleet numbering over 51 sails. Up to April 8, thirty-nine vessels had sailed as compared with seventeen at the same date in the previous year. The mackerel netters this year also made an early start and quite a number sailed before April 15.

The first mackerel of the season were landed at Cape May on April 11, this being two days earlier than the first landings of last year. There were eleven crafts all arriving within a short time of each other. They brought in a total of 140,000 pounds of mackerel, fresh, weighing from 1 pound to 2¼ pounds, but mostly of the expected size, namely 1¼ pounds to 1½ pounds. These fish were caught 85 miles south one half east from Cape May. First sales were from 25 to 28 cents per pound.

The southern mackerel season was most successful, the landings being in the neighborhood of 51,000 barrels as compared with the 1925 catch of 24,000 barrels which was considered large. The Cape Shore catch of the fleet, most of which came late, was far ahead of the previous year and the vessels, as soon as they arrived and took out their fares, paid their attention to operations in Massachusetts waters where fish were schooling liberally from Highland Light to Chatham and down in South Channel.

These operations, which began just before the middle of June and which did not cease until the last of November and which were practically confined to waters contiguous to the Massachusetts coast, produced the greatest catch of mackerel in ratio to the number of crafts engaged of which there is any record. Days were frequent when arrivals in Boston and Gloucester totaled from 750,000 to over a million pounds. Many times the market was actually glutted with mackerel; so much so that trip after trip was taken in at the Gloucester wharves and there split and salted. Mackerel were often quoted cheaper than cod and haddock. So great was the inrush that men worked at times all night putting these splendidly conditioned fish under salt. The scene at times on the various wharves at Gloucester can hardly be described. Sufficient to say that every available man who could split a mackerel was pressed into service.

It became usual, day after day, to find both at Boston and Gloucester, most ample receipts of fresh mackerel which naturally made the average price low. During the height of the season the number of vessels engaged reached over 100 sail, which is the largest in recent years. As the season advanced through July, August and September, the same success obtained; hardly without the interruption of a day were great trips landed at the Massachusetts fishing ports and the season ended practically on November 30 with a total catch of 304,385 barrels of fresh mackerel and 5,380 barrels of salted mackerel, a wondrous performance when the number of vessels engaged was concerned.

The Massachusetts catches of fresh and salted mackerel from December 1, 1925, to November 30, 1926, inclusive, and for the corresponding period of the two previous years, were as follows:

	Dec. 1, 1925 to Nov. 30, 1926	Dec. 1, 1924 to Nov. 30, 1925	Dec. 1, 1923 to Nov. 30, 1924
Salt Mackerel (Bbbs.)	5,380	12,442	11,000
Fresh Mackerel (Bbbs.)	304,385	203,961	101,954
	<u>309,765</u>	<u>216,403</u>	<u>112,954</u>

Cape Shore Catches of Mackerel for Six Years

Year	Arrivals	Fresh Mackerel (Pounds)	Salt Mackerel (Barrels)
1926	53	2,397,700	1,310
1925	34	1,545,000	1,075
1924	24	996,000	854
1923	31	1,240,680	211
1922	48	1,353,900	2,344
1921	29	2,160,000	3,003

Cape Cod Activities

It is not pleasant, but necessary, to record another bad year both as to catch and recompense for the trap fishing industry of Cape Cod. In many cases those engaged in this work did not make a living wage, and

yet to their credit be it said that while the past two seasons have been very discouraging and it has been hard work to keep fishing, still the men in the trap boats, as well as trap owners, expect to be on the job next year and "dig in" harder than ever in the attempt to register a good season. All they desire is for the fish to come into Cape Cod bay.

The situation can be fully sized up, when it is stated that one concern fishing three strings of traps, with fifteen men engaged, the high crew shared only about \$800 to a man and this represents practically labor for ten months of the year. While the traps had such a poor season, the freezers undoubtedly all along the Cape have frozen more fish than the previous year, but the fish taken in were generally of the small price variety and this accounts for the ill-luck of the trap crews. For instance, herring were very plentiful during the months of April and May. Many barrels went direct for bait for the fishing fleet while the rest were frozen and the price was only about \$2 per barrel. There was a fine run of whiting in July, August and September, the take of the traps being so large that after the middle of July the freezers practically cut down on the amount to be taken in daily. But these fish it must be remembered sold at \$1 per barrel. Then again there were plenty of squid in August and September, almost more squid perhaps than the freezers desired and the average price was only \$1.50 per barrel.

What was necessary of course to spell success for the traps was an inrush of mackerel and butterfish and other high priced fish into Cape Cod bay. This did not occur and the catch of these fish was smaller than for many years. It seems odd, in the face of the fact that only a few miles outside of Race Point the greatest season that mackerel seiners ever experienced on the Massachusetts coast was in progress, while the traps were certainly starving for mackerel, yet such was the case. Indeed it is a fact that but one school of mackerel was seined in Cape Cod bay throughout this whole record-breaking mackerel season.

One trap owner operating four weirs reported the largest catch of mackerel landed by his boats in any one day was a meagre ten barrels and at that time the market was so low owing to the glut made by the seiners fares landed at Boston they were obliged to freeze them. Very few mackerel were taken in the traps from June 15 to August 6, so after the squid struck in about August 1st this ended the taking of practically any sizeable amount of food fish in the traps excepting for a few days when some butterfish and plenty of whiting were taken.

The herring catch before alluded to was without question 50% larger than the previous year and this of course helped out a good deal. The whiting catch was good in June and July and the only trouble with the large take of squid appeared to be the fact that frequently they were of such large size as to not be popular with the captains of the fishing vessels who have to use them for bait.

At Barnstable the trap season was very poor and the stock was three-fifths of the last season's which in turn was small.

Very few horse mackerel were taken during the season so it would seem the theory that these fish were inside of the vast schools of mackerel and prevented them from coming into the Bay was, to say the least, not heavily sustained. Yet it does seem to be the general Cape Cod idea that the presence of squid in such large numbers did prevent the influx of food fish into the Bay in any appreciable quantity after August 1st.

Freezers have taken, as above stated, more fish than last year, but nearly all of the frozen product is selling at a very small margin, it was claimed. Nevertheless the freezers should be able to report a profitable year.

It is encouraging to notice that some of the traps during the season took quite a few small bluefish weighing from one to two pounds each

and also one trap at Provincetown on July 8 had a struggle with a young hump back whale which measured 18 feet in length and was finally landed on one of the wharves of the town.

The sea scallop fleet, that is the boats that fished for off-shore deep-water scallops, including crafts from Maine ports and seven from local ports did not fare as well as the previous season, in fact did poorly as a whole.

An interesting feature in the fish business of the Cape is the introduction at one of the freezers at Provincetown of filleting frozen whiting, this being done for a New York concern; the goods being filleted and packed in cartons at Provincetown and shipped to customers to the order of the New York concern. The outcome of this venture will be watched with marked interest. Should it prove successful; with practically no limit in an average year to the possible catch of whiting, it opens up a fish supply source which would meet practically any demand at a reasonable figure and be profitable.

The Provincetown flounder fleet last winter did very well as did some of the smaller crafts engaged in the same line of business during the summer. This fall some 20 of the boats went to Hyannis to fish on the grounds contiguous to that port. This was about October 20. They found the fish quite scarce and mixed in size. So unpromising did the outlook appear to be, that after three weeks of fishing, with very small catches daily to each boat, the crafts departed for the home port and since resuming fishing there have met with good success.

The fleet of mackerel netters that operated from here during the spring including some of the larger crafts did very well and this fall a great many of the boats which engaged in pollock handlining outside the Race met with marked success.

At Chatham the gill netters did not do as well on large mackerel as the year before, but the traps did better. The small mackerel and "blinks" did not come into the Bay at all, but were very plentiful outside. Squid were taken in about the same quantity as last year and brought very good prices. Butterfish were more plentiful than for three or four years, being very large in size and very high in price. Herring and "sardines" were plentiful and there was an abundance of cod in the traps. Lobsters were more plentiful than last year and ran later than usual by two weeks. Quahaug fishers did very well, the clams bringing good prices. Scallops were not as plentiful as last year, but were very high in price. Cod was very cheap during the summer, but steak cod did bring from 8 to 10 cents per pound laid down in New York for a short time.

Nantucket Fisheries

Despite the fact that at least six weeks were lost in the catching and shipping of flounders from this Island to the New York market from early October to mid-November, it is rather pleasing to note that the total shipments from this port were of practically the same amount, or within 75 barrels of the previous year, this year's shipments being 20,700 barrels as against 20,725. Beside the barreled shipments from here, it is estimated that up to the middle of October at least fully as many fares went through direct to the New York market as did the previous year. This being the case the flounder fishing year, while not met perhaps with as good average prices as during 1925, was far from a failure.

The story of the hold-up of Nantucket flounders at New York is told in detail in another part of this report. It is interesting here to note that while the embargo was on and many crafts were tied up idle at the wharves, some of the enterprising skippers immediately rigged their crafts for quahauging inside of Great Point and as the demand was large and prices good for these bivalves a commensurate recompense

for labor was received. Fully a dozen of the flounder vessels engaged for some time in this line of fishing and two or three of them even went into scalloping with not unsuccessful financial return.

The fishing for fluke or summer flounder was very good during June and July. The prices were low on this fish on account of mackerel being so plenty and cheap. The lobster season here was a very good one. Those who fished inside, or to the westward of the Point, brought in the smaller crustaceans. These latter report hauling up a great many small lobsters from four to five inches long and an increasing amount also of egg-bearing lobsters were noted during the season. A few men participated in the eel fishery during the months of September and October and did well as eels brought good prices when shipped alive. It can be incidented here that two men working together stocked \$900 in the two months.

A good supply of soft clams was noted, but all were used locally and sold readily at \$2.50 per bushel. It is estimated that the take was 700 bushels at least.

It was not possible to get the number of barrels of quahaugs taken in the past year, but the only buyer here states that his take was the same as last year and that on top of this, more were shipped by the diggers individually than the previous year. The season was most remunerative as the prices ranged from \$5 to \$9 per barrel.

The traps had a very poor season indeed, very few fish being taken and there was nothing doing in the mackerel line.

The scallop season began November 1st and up to the time of this report it had undoubtedly been the best season for a long term of years. The fishermen, on account of the weather and the plentitude of these bivalves, were able to go every day and get the legal limit of catch with the exception of three days. The scallops were the largest taken for many years and the prices have ranged from \$3.75 to \$4.50 per gallon, with the greater amount of the catch selling for above the minimum prices. Old fishermen say that this scallop fishery gives every indication of continuing successfully to the end of the season.

Buzzards Bay

The Buzzards Bay fisheries have for years been a very interesting factor in the doings and reports of the Division of Fisheries and Game, therefore we may be pardoned for going into the story of the operations of last year somewhat in detail.

The traps in general had a very successful season, taking considerably more tautog, scup, sea bass and squid and mackerel than last year. No bluefish have been reported in the Bay this year. On the eastern side of the Bay a fleet of ten boats fished continually throughout the summer with hook and line and met with good success. Early in the spring they caught at the head of the Bay large quantities of tautog; along in June, July and August fine catches of large scup, all these fish being shipped through the Woods Hole market.

The quahaug draggers this season are doing very well dredging from about off West Falmouth down as far as Cuttyhunk. The scallop fishermen are also reported to have done very well, the scallops being of large and excellent quality.

The Woods Hole view of the season, which includes of course the commercial view, is to the effect that about the same number of swordfish were landed there as the previous year, but a number of the fares came from Georges bank. As a whole the fishing along the shore was very much poorer than last year, less swordfish and mackerel being taken in these waters. It is the opinion in Woods Hole that due to the low prices on mackerel in Boston where the market was glutted or filled practically all of the season, some of the shore boats here could not afford to operate.

It is encouraging to receive the report that more bass and bull's-eye mackerel have been taken than for at least 15 years. Handlining for scup and bass was also the best for years, although the take of butterfish and squid was not up to the average and the lobster catch appeared to be on the decline.

Another report of great interest and apparently from an authoritative source states that the mackerel fishing in the Bay during the season was very poor, but that 12 fish were taken with rubber bands around their necks and no tagged fish were caught. Less flounders were caught than the previous year, the cod taken were smaller in size and no tagged fish were taken. Very few haddock were landed, but those caught were very large. Squiteague were in very small receipt, those taken being of large size, while more sea bass were caught than all the total of the last 15 years. Those caught in the spring were very small, but ran larger later on in the season. Less bluefish were caught, although the size was larger than usual, ranging from $3\frac{1}{2}$ to 7 pounds. A big decrease was noticed in the menhaden catch, the same story applying to tautog and alewives. The squid taken were all of the bone variety and the total catch was little above normal.

There was a great increase in the catch of bull's-eye mackerel. Many of these fish were too small for the New York market being from 8 to $8\frac{1}{4}$ inches long. The wholesale price was as low as \$1.50 per barrel. Less butterfish were taken, but those caught were larger in size. The traps in the Bay were set earlier and the scup ran earlier, some showing before the traps were out. It was a poor year for the traps. About half the usual number of lobsters were taken and these were very small, just over the nine inch measure. A great deal of trouble was experienced with ship worms which came late and stayed late.

At Westport it is noted that more fishermen were engaged than the previous year. Lobsters were not as plentiful, while quahaugs showed a 25% increase, several large beds being found during the last month. There was a decrease of at least 30% in the local taking of clams, while the scallop take was about the same as last year, this statement applying also to oysters. The tautog catch was less than the previous year by about 30%, while mackerel were plentiful in local waters. A great many more codfish were taken in this section, scup showing about the same as last year. There were more eels caught in the local rivers and ponds. The report on sea bass is that there were more fish than last year, although fewer fish were caught for the reason that these marine epicures would not bite any of the baits offered them.

The report from the New Bedford angle is to the effect that the spring and summer mackerel fisheries produced landings of about 1,000 barrels at this port (possibly 75% of which were seined fish) as against a total landing of 1600 barrels during the previous year. It is to be understood that this New Bedford report is a story of the fishing business of the port and not confined to the catch alone made in Buzzards Bay.

A total of 800 swordfish was landed here during the summer as against 1612 for the previous year. This simply shows the failure of the swordfish season on the western grounds, although the swordfish season as a whole was a marked improvement over the previous one. At this port 8 or 10 fish were found to be jellied and were condemned. From the New Bedford point of view the swordfish fishery was little less than a failure. More groundfish and a considerable amount of flounders were landed at this port during the year by the flounder dragging fleet. These landings were made up of small trips or "broken" trips of large crafts. The New Bedford view of the fisheries in Buzzards Bay is as follows:

The year was even worse than last, the traps doing very little. Hand-line fishery in the Bay was also very poor. The traps on the south

shore did catch a few mackerel and scup in the spring, but have been doing very little since. As affecting the New Bedford market and shipments, the traps at Marthas Vineyard did about the same as last year and the New Bedford fish concerns are obliged more and more to depend on fish coming from a greater distance to supply their trade. Scallop takings in the New Bedford area for the season opening October 1st (this report being up to November 1st) are said, by one of the largest concerns, to be at least one half less than last year.

Martha's Vineyard

In general terms the fishing around Marthas Vineyard for the present year sums up as follows: Lobsters—poorest season for ten years. Quahaugs—same as last year or perhaps a little better. Clams—about the same as last year. Scallops—very scarce, the yield being far below last year's catch. Free-swimming fishes—more than last year.

The above paragraph is an introduction to a more complete report of what fishermen of this Island have done during the year 1926. Speaking for the western end of the Island the following statement will be found to cover the situation:

Spring codfishing was rather better than the average, trawlers and handliners bringing in good fares and prices averaged around 3c per pound out of the vessels. The spring spurt of pollock was of too small a run for the market, but the fish were fairly plentiful. There was no large run of scup, but the traps picked up a few right along and with butterfish coming right behind them.

The traps in the Sound did not fare as well as those in the Bay, but in either case it could not be called more than a "fair to good" year. Trap and seine mackerel were more scarce than common. Some of the boats to the eastward however, had some good fishing drailing large mackerel.

Lobstering was the poorest this past season that many fishermen remember. The older fishermen blame the failure to the presence on the ground of vast quantities of codfish, large and small. They claim these fish feeding around the rocks in such large numbers have had a tendency to scare the lobsters sufficient to keep them from potting. Lobster prices did not range as high as last year. The dealers claim the demand was lighter and the average price was about 32c per pound.

Swordfish were again scarce this year on what is known as the "inshore" grounds, although they were fairly plentiful on the banks. The otter trawlers operating for summer flukes did well during the month of June to the southward of the Island. They had only fair luck however in the Sound where they usually do well. Prices paid were from 8 to 12c per pound out of the boat.

Fall codfishing has resulted in large catches, the fish for the most part being rather small and bringing around 3c per pound.

The flounder fleet reports poor prices, this being due partly to the fish running small, but mostly due to the fact that New York dealers claim the offshore fish, for some unknown reason have smelled strong, as of iodine. This knocked the demand and prices flat at New York, the principal market. These so-called affected fish seem to be found only to the eastward of Nantucket and fish from other well-known flounder fishing grounds have not been similarly affected, although the receipt of these so-called "medicated" fish at New York has had a severe effect on the whole flounder market.

The report from the Edgartown end of the Island is as follows: the past season has been the poorest for years for the shore fleet. The run of alewives was fully as large as the preceding year, but the catch was smaller, about 3,000 as against 4,000 barrels. These fish ran so late that a great many went into the pond after the men had quit fishing.

Mackerel were scarce all the year, and flounders were not only scarce, but cheap. A few more swordfish were taken inshore than for the past two years, but not over 100 were landed at this port. No bluefish and but few sea bass were reported as being taken. Scup were fairly plenty from the middle of June to the middle of September and prices were lower than for several years.

Quahaugs were fairly plenty and the prices were about the same as the preceding year. The catch was 5,500 barrels, this amount being a little smaller than the preceding year, this being accounted for by reason of the fact that many of the men who usually engage in quahauging were making more money by taking out sailing parties of summer people during July and August. Scallops were very scarce, but prices were about 40% higher than last year. The only beds around the island are located here and this year, with the small catch, prices hung steadily around \$4 per gallon.

Boston Fishing Activities

It is safe to say that Boston is one of the largest fishing centers of the world. Year by year the fish receipts of this port have been gradually ascending, until at the present time, a statement that fully 225 million pounds of fish are received and distributed from this port is not an exaggeration. Such an amount challenges the admiration of the fisheries world and places the capital of the oldest fishing state in the country on the pedestal on which it truly has a right to stand.

Boston receives its fish mainly from the great fleet which lands daily at the Boston Fish Pier and at the Packet Pier so-called. In addition to this, trains, steamers and trucks bring daily much fish to add to the general total, the scope of its receipts being encompassed only by the great Canadian and American ports of the Pacific, also the Canadian Atlantic ports, and also all ports along the New England and Middle Atlantic coast. Truly Boston is one of the greatest fish ports of the world.

As usual, in speaking of the year at the Boston Fish Pier, which is the largest single fish pier in the world, the State is fortunate in having the opportunity of printing the following resume from the pen of F. F. Dimick, Secretary of the Boston Fish Bureau, whose reputation in the fisheries world is too well known to need comment.

Mr. Dimick says:

"A large volume of business was done on the Boston Fish Pier during the year 1926, and business has been fairly profitable. Competition, however, is very great. The production of groundfish by the fishing fleet was a record one, about 50% of which were haddock. The fillet business, which uses a large quantity of haddock, has continued to expand. The installation of labor saving machinery has aided in the output of fillets.

"Owing to the success of the fishing fleet in the mackerel fishery the amount of mackerel distributed was the largest on record. A large quantity was also put into cold storage. The bulk of the fish landed weighed from 1½ to 2 pounds each, and were of fine quality. Large mackerel, and tinker mackerel were in very light supply, and the fishermen did not see such large bodies of small mackerel on the fishing grounds as for a number of years past.

"The foreign receipts of mackerel declined owing to the low prices that prevailed for fresh mackerel much of the time. After deducting 2c per pound duty and freight charge also, very little was left for the foreign shipper.

"The headline codfishermen which come to this market with codfish principally had a very successful season compared with past years as they landed quite a few large codfish which brought a comparatively good price, and, in the Fall of the year, high prices.

"The catch of fish in the Cape Cod traps has been light except of squid. The Spring catch of herring was good.

"Squid has been very plenty on the fishing grounds the past season, and the fishermen have jigged them in many instances, supplying themselves with bait.

"The business in flounders continues to grow, the fleet landing these fish has increased, and many of the vessels have made good stocks in this branch of fishing. Lemon and gray soles and blackbacks are in lighter supply.

"A larger fleet than usual engaged in the swordfishery, and made good stocks and shares owing to the high prices received for their catch. The total catch of the fleet was 13,994 fish, compared with 8,446 the previous year. The receipt of Canadian swordfish was 100% larger than the previous year.

"Practically no menhaden were caught this year north of Cape Cod."

Receipts of Fish at Boston Direct from the Fishing Fleet from December 1, 1925 to November 30, 1926.

	Pounds
Large Codfish	31,384,778
Market Codfish	9,282,793
Cod Scrod	102,320
Haddock	70,549,563
Scrod Haddock	9,829,783
Hake	3,213,105
Small Hake	1,244,727
Pollock	2,674,450
Cusk	1,452,000
Halibut	2,818,086
Mackerel	23,708,292
Swordfish	2,378,980
Miscellaneous	5,390,500
Total	164,029,377

The Gloucester Fisheries

While an increase of activity and prosperity are both noted in the fisheries and the fishing business at this port there is a decrease in the landings from the previous year of some eight million pounds. However, sometimes the prosperity of an industry cannot be accurately gauged by the gross receipts and that seems to be the case this year at Gloucester. The facts are that the fishing fleet has done well and the fishing, shipping and curing concerns have each turned in a prosperous year, almost without exception. It is an encouraging fact to note that there is a growing demand for wharf property and buildings and where a few years ago grass seemed destined to grow on some of the wharves along the harbor front, today wharf property is really valuable and very little of it available on the market.

Gloucester, as far as fishing and the fishing industry is concerned, has had a healthy year, one drawback however being the failure of the export business to South Atlantic islands and countries. There has been an increase in business, there has been an increase on the part of the concerns in expanding the scope of their endeavors. More attention is being paid to the canning of fish; also there is a direct and noticeable advance in the matter of producing machinery which will result in bringing to the consumer fish in such shape as to leave no work to be done by the housewife except the cooking.

Many of the vessels of the port have made wonderfully large stocks; many of the crews have shared well; many of the firms, in fact most

of the firms, report a prosperous year; so in spite of the fact that the total catch landings are a little smaller than the previous year, there is no opportunity for any assertion that the business is going back, but on the other hand there is every opportunity for the assertion that, following the local upward trend since 1923, the Gloucester fisheries are not only increasing in worth, but in value.

A scrutiny of the figures showing the landings of the various species of fish at the port for the year closing November 30 shows the outstanding feature to be a very noticeable decline in the receipts of fresh haddock. Whereas in 1925 nearly 15 million pounds of these firm-fibered fish were brought to the port for the purpose of being split and salted, the present year shows receipts of but 8½ million pounds. This decline of over six million pounds in this particular species is accounted for by the slump in and the disturbing conditions in the export market during last spring. Conditions were such in this market that local curers could not pay \$1 per hundred weight for these fish landed fresh and break even on the same goods salted, cured, dried and shipped to southern Atlantic islands and countries. Finding this to be the case, the crafts which annually attended the Gloucester market with capacity fares for splitting and salting, turned their attention to catching codfish, with the result that the receipts of fresh cod showed over a two-million-pound increase, while the receipts of salt cod showed over a million and three-quarter pound increase, this latter pleasant result being due, no doubt, to the insistence of the fish inspection department of this Division that in order to land capacity trips from the eastern banks in proper condition, the first catches of the trip should be salted.

The receipts of pollock were less by over a million pounds, due to the smaller activities of the gill netting fleet.

The increase of over two million pounds in the landing of fresh mackerel is one of the most gratifying factors to mention. Landing all this great amount of fish not only meant the converting of the great bulk of this catch into salted mackerel, but furnished labor for hundreds of men on the various wharves, the rush in this line being so great at times that men worked practically all night at the keelers splitting and salting down the proceeds of one of the greatest mackerel runs in history. Other branches of the industry went along about as usual.

The following tables give the landings of fish at this port from December 1, 1925 to November 30, 1926:

	Pounds
Salt Cod	5,788,731
Fresh Cod	28,496,158
Halibut	48,254
Haddock	8,673,051
Hake	1,037,070
Cusk	586,275
Pollock	1,635,720
Flitched Halibut	2,860
Not product of American Fisheries	7,226,441
Fresh Mackerel (Pounds)	8,686,180
Salt Mackerel (Barrelled)	3,756
Fresh Herring (Pounds)	893,250
Salt Herring (Barrelled)	1,461
Salt Bulk Herring (Barrels)	17,950
Cured Fish (Quintals)	18,789
Miscellaneous (Pounds)	2,062,081
Total December 1, 1925 to Nov. 30, 1926—72,414,017 pounds.	

SHORE FISHERIES

From the northeast section of the State, which takes in Newburyport, the mouth of the Merrimack River and waters contiguous to Plum

Island and also the flats in these vicinities, the report is that, owing to the enactment of the so-called shellfish law of 1926, Chapter 370, clamming as far north as Salisbury, Newburyport and Newbury diggers are concerned has practically stopped. This includes not only the prohibition of taking clams for food purposes, but also of the taking of clams, mussels and cockles for bait purposes and this action is claimed by the fishermen in this vicinity to affect their fisheries operations to a marked extent, because, in order to catch fish, one must have bait to start with. As to those sections not coming within the contaminated areas in the cities and towns above mentioned, and in Rowley, the clambers seem to have had a prosperous year; even better than last year, and they report an abundance of small clams and spat on most of the flats.

The lobster fishery in this district is declining, and fewer and smaller lobsters are being taken annually. The lobster season this year was an extremely poor one and much fishing gear was lost during the heavy southeaster in September.

The few boats engaged in flounder fishing in this district had a fair season, but not as good as last year. It is encouraging, however, to note that one new craft has just been completed at Amesbury to be used in this line of the fisheries.

There have been no pollock or herring to speak of in these waters this year. About five or six dory trawl and handline fishermen have eked out a fair season's work on cod and haddock. Mackerel were plentiful for several weeks and were taken in goodly numbers on hook and line. These fish weighed from two to three pounds each, and though landed in the best of condition could hardly be disposed of because of the glutted condition of the fish market generally. No boats from this district engaged in netting or seining of mackerel this year.

The sand eel seiners have had a successful year, though not equal to that of last year in catch or catch value. Now that the taking of shellfish from contaminated areas in this district is prohibited, these sand eels form practically the one supply of bait outside of sea worms, for the local commercial fishermen.

The Parker River smelt fishery was an extremely poor one last winter for some unknown reason, although there was a good run of smelt on the spawning ground in the streams in this district last spring. No smelt fishing was attempted in this district until salt water ice made on the streams. It would seem fair to state that the smelt fishery in this district is on the decline.

In the Gloucester district, so-called, the lobster fishery was pursued with fair success as compared with recent years. The total catch should measure up to that of last year, if not a little better. Lobsters were taken in goodly numbers in the early spring and summer, being a little late in shedding, and were fairly plentiful during the fall. Prices ranged a little higher than usual. "Shorts" and "seeders" were about as numerous as usual and this naturally would indicate a fair future for the fishery in this district. The loss of gear, however, in this district was very heavy to those who fished in the outside waters, due to several heavy storms.

Native crab meat is getting to be quite a popular commodity in this vicinity and several fishermen have gone into this fishery in earnest. These crustaceans seem to be quite plentiful as yet, but should the present intensive fishery continue it might be well to consider some conservation protective measure.

Soft clams, the only bivalves taken commercially in this section, are ever increasing in popularity and in consequence thereof the supply is gradually beginning to feel the drain upon it. Without doubt the year just closing has been a banner one for this industry in this locality. More men have been engaged in the business, more clams have been

taken, and prices have ranged higher than last year, and with so many of the flats closed to digging on account of being judged as contaminated, the drain on the unpolluted flats has been much greater. Hence the judgment as expressed above in this paragraph. The towns of Essex and Ipswich, apparently realizing these conditions, have taken some prohibitive measures by closing certain areas for certain seasons of the year. While perhaps the clam proposition, as far as the taking is concerned, is really a city or town affair, still those who have the general oversight of the State's fisheries, should have a watchful eye on the situation and be prepared, if the occasion requires, to enact reasonable prohibitive measures.

The shore fisheries as a whole were less productive than last year, not because of lack of fish, but because the phenomenal run of mackerel caused practically every boat and man that could be secured, to enter this line of fishing. During the winter, however, gill netters did very well, being bothered at times by rather long spells of bad weather, for which high prices compensated in part.

The shore trawlers had a good season. Less herring have been taken along the shore during this summer than usual by the seiners, owing to the more alluring pursuit of mackerel. This fall, however, herring have been very plentiful in Ipswich Bay and in the contiguous rivers, but owing to the fact that the freezers were laden with mackerel the market for this splendid bait fish was practically confined to day-by-day orders of captains and fishing vessels desiring them for bait.

The spring run of alewives was heavy, more having been taken in the Essex stream than for many years. This, probably, is owing to the fact that the town closed the season for two years, thus giving this fish a chance to multiply. At Ipswich quite a lot were observed ascending the fishway for the first time in years, showing that the restocking plan of the Division in this vicinity is proving to be successful.

The absence of butter fish, the scarcity of Old England hake and other school fish, outside of mackerel, had the effect of making the shore fisheries season for the trap fishermen a very poor one, and were it not for the success of the mackerel fishery, as above mentioned, the small boat men would have indeed fared badly; possibly approaching a failure season.

Smelt, while not figured generally as a commercial fish in this district at least, have been unusually scarce in every section. Less smelt have been caught than for many, many years, and the smelt fishermen, good sportsmen generally, are in a quandry as to the cause of the small run of their favorite fish.

Concerning the Lynn and Nahant district, it is pleasing to note that the lobster fishermen have had the best season for many years. Not only were they favored by good catches, but prices averaged above the previous year. The fishermen themselves are encouraged as to the outlook for next season by finding an increase of seed lobsters and many more small and "shorts."

The clam flats in this district are practically within the prohibited area and clams taken from them are, to use a drastic term, "poached." Every effort is made to control this contraband dealing in clams, but it is fair to state that some are still reaching the market. It is simply a point in fact that no man can cover adequately the three mile fishery section limit lying off the coast, the clam flats and the uplands with its game, the brooks and ponds and streams within each over-large designated area, which for lack of more men, the Division finds itself obliged to allocate to each warden.

The gill netters did fairly well and the run of fish was large in size. The absence of haddock, however, is noted by the captains and is a cause of some concern, particularly in the light of the large catches of haddock the year before.

The catches of free-swimming fish were not as large as the year before. Mackerel did not school as close in to the land as they have for some years past. The menhaden or "porgy" seiners came into the Bay as has been their custom for the past several years, but found no fish of the sort they desired. This is of marked importance because for the last three years the porgy seiners, large fleets of big steam powered crafts, have had no difficulty in taking whole cargo loads in these waters in very quick time.

The smelt fishery in Lynn Harbor and adjoining districts was a failure, owing perhaps to dredging operations, but it should be noted also that the failure of the smelt fishery here fits in exactly with the scarcity reports from all along the coast. There is indication here of some of the old-time lobster men taking up crab fishing, as these crustaceans are gaining favor with the fish consuming public and are bringing prices that make it profitable for the fishermen to catch them.

For the district in which is centered Boston Harbor and immediate vicinity the catch of lobsters has shown a slight increase, but during the season the lobster fishermen lost more gear than for years owing to bad storms and winds. The seizure of lobsters (lobsters under Massachusetts legal length) from Nova Scotia and New Brunswick shipments was below the number usually found. This was due to the small catch and correspondingly small shipments from the above named places. The Boston lobster dealers have experienced one of their poorest seasons for years.

The Italian fishermen report their catch of free-swimming fishes as normal.

It should be noted here of course that clams cannot legally be taken from flats of Boston Harbor, this section being closed as a contaminated area by the State Department of Public Health.

Reports for the Plymouth district are to the effect that nearly the whole area of clam flats in this town have been closed by the State Department of Public Health and in the legal digging area around Clarks Island about the usual amount of clams have been taken and the outlook is good for the coming season.

There was a fair catch of mackerel in the traps and some fish were taken by small seiners. The codfish and haddock catches can be termed as average, and there was a good catch of herring, mostly large.

In the Quincy-Cohasset district the marine fisheries for the year resulted in about the same catch as for the past few years with the exception of lobsters, which while the total catch has not been much greater than that of the previous year, still was marked by exceptionally good spring fishing. During the month of March the weekly catch was better than 1,000 pounds per man.

There is practically little or no commercial fishing of the free-swimming fishes in this district, but a great many pleasure fishermen enjoy the sport on the grounds along here and report very satisfactory catches of both cod and haddock. The smelt fishing this year, as in the past few years, was poor. Shellfish areas in this district are all closed because of being within the polluted section, except for a small area at the mouth of the North River and the flats there are depleted.

Reporting for the Cape Cod section to the east of the canal, our advices are to the effect that netting mackerel this season at Monomoy, unlike last year, was a failure. The lobster season was fair, not as many lobsters taken, but the catch bringing higher prices. Trap fishing failed to quite an extent as far as the taking of mackerel and butterfish were concerned, while good catches of herring, whiting and squid were made. Very few mackerel came in, either on the Vineyard Sound side of the Cape or the Cape Cod Bay side. A more extended report of Cape Cod fishing activities will be found under the usual heading.

At Fall River and vicinity very little fishing is carried on. The shell-

fish areas have practically all been condemned by the State Department of Public Health owing to pollution; this edict cutting out the best producing areas in that vicinity. The commercial oyster fishery, in the opinion of the deputy in charge of this district, is now gone altogether.

The lobster season was a poor one, the catch being small in comparison with the past five years, but the fishermen gained some recompense from the fact that prices were good and held fairly steady throughout the season, 40c per pound being the highest wholesale price quoted. The lobster fishermen all practically quit by September 1st, owing to the poor catches.

In all, about 14 boats fished out of Westport and the total catch for the year is estimated at 40,000 pounds. Several of the small boats went into handlining after the lobster season closed. Tautog and cod were the principal fish caught. However, there is no extensive fishing here of the free-swimming fishes and the year's catch could be covered inside of 50 tons.

The scallop fishermen report fair catches. During the year an interesting incident has been the removal of oysters in the polluted areas in the Taunton River. During May and June, George Green of Warren removed 95 hundred bushels of seed oysters and transplanted them into clean waters.

In the Duxbury section the lobster fishermen consider that they did fairly well, not so much by reason of increased catch but because of higher prices on the average than the previous year. No smelting was done this year and no small mackerel were taken to speak of. Some tautog were taken, but speaking generally no regular commercial fishery is carried on from this section.

Reports from the New Bedford district indicates that the lobster season was about normal as for catch, the size averaging about 1½ pounds per lobster and the wholesale prices ranging from 25c the minimum and 35c as top price. Some fishermen report catching numerous lobsters under nine inches and also egg-bearing lobsters and the season closed hereabouts on September 1st.

The quahaug industry seems to flourish in this district and maintained its high average this year, these shellfish being fairly plentiful in the waters of Buzzards Bay. The average price in the wholesale market was about the same as last year.

This has been an exceptional year for scallop taking in the towns of Mattapoisett and Marion. In other towns, such as Fairhaven and Dartmouth, the fishermen made fair catches. The fishermen report no seed so far. The wholesale price on the opening day of the season was \$4 per gallon and since that time dropped but once, when this succulent bivalve product was quoted at \$3.50 per gallon and that only for one week.

There is a small amount of commercial fishing in this district, being confined mostly to the taking of tautog, mackerel, eels, scup, and flat fish by a few small boats.

Summary of the reports of the shore net and pound fisheries as required by Section 148, Chapter 130, G. L.

Number of men engaged, 149; number of boats, 134; value of boats, \$57,323.00; number of fish pounds, 59; value of fish pounds, \$73,912.50; number of nets, 443; value of nets, \$8,620.00; catch in pounds:

Alewives, 147,793	Sea bass, 3,712
Bluefish, 11,071	Sea herring, 20,074
Flounders, 109,896	Shad, 12,583
Mackerel, 647,536	Squeteague, 1,199
Menhaden, 66,637	Striped Bass, 380
Pollock, 17,516	Squid, 1,089,988
Salmon, 178	Tautog, 17,557
Scup, 74,857	Other edible or bait species, 3,797,-

512

Total pounds 6,018,489; total value \$146,869.36.

THE LOBSTER FISHERY

Replies to questionnaires sent to coast wardens and other authorities bring out the facts, that the number of men engaged in the lobster fishery shows an increase of 64 over the previous year; the catch of lobsters was 85,334 less, while the value also shows a decrease of some \$6,000. Fewer egg-bearing lobsters were returned to the waters than in the previous year by some 2,500 in count. The inquiry, which covered the entire stretch of coastline, shows a wide variance in reports of catch and fishery conditions, being due, without doubt, to the varying weather conditions existing. It is not the intent of this report to go further than to submit the actual statistics, but it would be negligent on our part did we not call attention to the gradual depletion of the Massachusetts catch of lobsters and the fact that the bulk of that catch is at the present time made from the small lobsters.

The Division has proposed certain changes in the lobster laws, calculated to build up the stock, but these have not been backed by the sentiment of the lobster fishermen. Until such time as the fishermen are willing to join in some constructive program that will put the whole industry on a sounder business basis, a further depletion will, in all probability, take place.

During the spring, from shipments from Nova Scotia, New Brunswick and other points outside the State, there were seized at Boston 80 egg-bearing and 12,000 short live lobsters, all of which were distributed on favorable lobster locations along the whole State coast.

The totals of the tabulation of the returns of the year's fishing, required of the lobstermen by law, follow. The period covered is Oct. 20, 1925 to Oct. 20, 1926.

Number of men engaged in the fishery, 571; number of boats, 750; value of boats, \$188,609; number of pots used, 38,942; value of pots, \$103,563.15; number of lobsters taken, 963,477; pounds of lobsters, 1,445,215; value of lobsters, \$391,343.27; number of egg-bearing lobsters taken and returned to the waters, 9,978.

As required by Chapter 130, Section 106, General Laws, it is hereby reported that the number of lobster licenses issued in 1926 was 898.

BOUNTIES ON SEALS

The following towns were reimbursed by the Commonwealth for bounties paid on seals under Chapter 130, General Laws, Section 155: Barnstable, \$6; Chatham, \$4; Duxbury, \$104; Essex, \$12; Gloucester, \$2; Ipswich, \$6; Marion, \$2; Plymouth, \$2; Salisbury, \$4; Yarmouth, \$22; Lynn, \$2; Newburyport, \$8; Rockland, \$2; Revere, \$2; fees to treasurers, \$44.50.

MOLLUSK FISHERIES

Little that is new can be said of the mollusk fisheries. All available data was collected by the biological department from the diggers and those engaged in the industry, details of which are in the office files. In this general survey, few changes are noted since last year. The outstanding points were the higher prices obtained in the market in 1926, and the fewer clams which were dug.

Clam

On the whole, a fair year was experienced. In many sections it might be termed extremely prosperous, while in others, very poor. The prices obtained for clams were higher than has ever been noted before, but the production, on the whole, was smaller.

Under Chapter 710, Acts of 1912 the clam flats of the town of Essex were leased to the town for ten years from March 24, 1926, and the clam flats in Salisbury leased to that town from May 1, 1926.

In certain localities the industry was greatly affected by the provisions of Chapter 370, Acts of 1926, excluding the public from certain regions where additional flats have been found contaminated, to more excessive digging than would ordinarily occur. It is a question how long some of these unpolluted areas will be able to stand the present volume of fishing.

Oyster

A fairly good season was experienced. The production in Chatham, for example, was considerably smaller than in 1925, although the prices remained the same. It is also interesting to note that, in Barnstable, no oysters were reported as dug in 1925, while this year, 4,000 barrels were obtained which marketed for as high as \$12 per barrel.

In the summer the U. S. Bureau of Fisheries made a preliminary survey of the important oyster grounds on Cape Cod, in order to locate suitable areas for experimental field work in oyster culture next year.

Quahaug

A fair season was reported in most cases by the quahaug diggers. In Wareham, Eastham, Wellfleet and Edgartown a prosperous year was experienced. The production was considerably greater than in 1925, and, on the whole, the prices obtained were considerably higher, bringing, in some instances, as much as \$14.50 per barrel wholesale.

Scallop

A normal year was reported. From fifteen towns, in which scallops were taken, six reported a decidedly prosperous season, and of the remainder the reports run from fair down to comparative scarcity, or poor in several cases. The production in practically all areas was good, and in most cases higher prices were obtained than last year. The scallop beds are said to be in fair condition.

Contaminated Shellfish Areas

The examination by the Department of Public Health of the shellfish areas of the State with respect to the fitness of the shellfish therein for use as food (begun in 1925 under Chapter 300, Acts of 1925) was continued to completion, and this Division received notification of its determination of the contaminated and apparently uncontaminated areas. A complete description of all the areas certified to be contaminated, is too voluminous for inclusion in this report.

The act specified that its provisions should be enforced by the wardens of the fish and game division and other officers authorized to make arrests, but carried no appropriation for the purpose. On the expiration of the period for which the law was enacted—June 1, 1926—the General Court, By Chapter 370, Acts of 1926, continued the powers of the Department of Public Health as set forth in the act of 1925, and provided an appropriation of \$6,000 for this Division for the enforcement of the law. Five wardens, designated as coastal wardens, were appointed, and functioned throughout the remainder of the year, as set forth under Law Enforcement.

ALEWIFE AND SHAD

Chapter 68 of the Acts of 1926 gave the cities and towns along the Taunton Great River the right to lease the alewife and shad fisheries in that river for a term of ten years or more. This was an advisable change, because no person desires to take a lease of these fisheries unless he can have sufficient time, not only to develop the fisheries, but to realize some profit on his investment. This cannot be done unless he can control the fisheries for ten or more years.

Statistics were again collected, wherever possible, on the alewife fisheries. These are on file at the central office. This year's catch of alewives showed a decrease over last year's, 11,151 barrels in 1925 against 10,264 in 1926. From 54 streams, from which data were collected, 8 showed an increase in the catch over 1925, 9 a decrease, and the remaining 37 streams either were not fished, or no information was available. These figures, however, do not necessarily signify that the alewife fisheries in the State are on the decline, for in several instances it is well known that the entire run of fish was permitted to pass to the spawning beds, and on these streams, of course, no figures could be obtained. There were several streams on which seining and fishing rights were not sold this year, and these were the ones, in most cases, where the fish were allowed to run to the spawning beds, although some of the fishermen who did buy rights to fish, appreciated the wisdom of making certain that large numbers of fish reached the spawning grounds, particularly where the right or lease to fish extends over a period of years.

The prices obtained for streams where fishing and seining rights were sold, ranged from as low as \$5 to as high as \$1475.

The sales of alewives caught during the run were obtained and recorded wherever possible. The price for fisheries operated commercially ranged from 50c to \$7.89 per barrel, this price being higher than in 1925.

The work of keeping the coastal streams open for the use of the alewives, and making additional streams accessible to them, is receiving systematic attention, and each year finds a certain amount of progress made beyond the accomplishments of any previous year. This work is fully set forth in the section on Fishways.

The transplanting of adult spawning alewives was continued and plantings made as follows: in Monponsett Lake, Halifax, were planted 406 adult alewives from Pembroke. The result of this planting was most successful, for thousands of young fish 6 inches in length were seen, in October, descending to the sea. In Lake Nippenicket, Bridgewater, were planted 1,321 adult alewives from East Taunton. In the Town River, West Bridgewater (directly above the Stanley Iron Works fishway) were planted 201 adult alewives from East Taunton. The object of this plant was to ascertain whether or not these fish would ascend the Easton Investment Company fishway, at West Bridgewater, the next above. This they were seen to do. In Town River, West Bridgewater (just above the Jenkins Leatherboard Company fishway) were planted 131 adult alewives from East Taunton, to ascertain which way these fish would turn, that is, whether to the Satucket River toward the Carver Cotton Gin Company fishway, or to the Town River toward the Stanley Iron Works fishway. Careful watch was kept, and they were observed in the latter, but not in the former.

Although the total of 2,059 alewives planted this year is less than in other years, good results from them have been reported.

Respectfully submitted,

WILLIAM C. ADAMS,
Director.

APPENDIX

RECOMMENDATIONS TO BE CONTAINED IN THE SIXTY-FIRST ANNUAL REPORT
OF THE DIVISION OF FISHERIES AND GAME FOR THE YEAR 1926

The Director respectfully recommends the passage of the following laws:

1. *To repeal the Law relative to the training of Hunting Dogs.*—Under the present law dogs may not be trained on any protected species of birds or game between March 1 and September 1. This law does not prohibit the taking of fox hounds into the woods during this time (for the fox is given no protection by law), or other dogs under the guise of hunting unprotected game. It does not restrict the self-hunting mongrel dog which does a great deal of harm to birds and game. No practical scheme can be effected which would tend to keep all dogs out of the woods during the time that game should be unmolested. Therefore, it is unfair to restrict the bird dog and the rabbit hound and allow other dogs, which do more damage than any trained hunting dog, to run at will.

2. *Relative to fishing in Inland Waters.*—Today no license is required to fish in inland waters not stocked subsequent to Jan. 1, 1910. While the greater part of such waters have been so stocked, the law requires the publication yearly of a list of stocked waters at the expense of considerable effort and money for their compilation and publication. If the Commonwealth has expended substantial sums to stock waters prior to January 1, 1910 from which our fishermen are now receiving benefits, there is no logical reason for permitting these waters to be fished without the purchase of a license. This provision has cost the State many hundreds of dollars in loss of revenues from licenses; has made law enforcement difficult; has wrought much confusion among the fishermen, and it should be repealed.

3. *To permit the Department of Conservation to Enlarge Game Farms and Fish Hatcheries.*—It was impossible to see, years ago, the desirability of enlarging some of our fish hatcheries and game farms. It is very possible in the future that desirable improvements at these stations will be blocked by reason of hold-up prices which certain persons owning adjacent lands are now in a position to demand. Therefore, it is important that the Department be given the right to take, by eminent domain, land adjacent to these stations, if such land cannot be purchased at a reasonable price, and if the land is necessary to make any needed improvements and extensions, or to protect the natural resources of the present stations.

4. *Relative to Loch Leven Trout.*—While most people consider the brown and the Loch Leven trout to be one and the same fish, it is desirable to avoid any technicalities and to definitely state in the law that the Loch Leven trout shall receive the same protection as the brown trout now receives. Therefore, we recommend that the law be amended to give the Loch Leven trout specific protection.

5. *Relative to Blue Gills and Sunfish.*—The Division has expended considerable money for the propagation of the blue gill and several ponds throughout the Commonwealth have been stocked with this species with gratifying results. Therefore, a reasonable closed season; a legal minimum length; and a daily catch limit should be provided for blue gills and all other sun-fish, in order that they may have a chance to establish themselves in our waters.

